



JOURNAL

MAY,
1892.

OF THE

MILITARY
SERVICE
INSTITUTIONWILLIAM L. HASKIN,
Editor First Part.Authors alone are re-
sponsible for opinions
published in the Journal.JAMES C. BUSH,
Editor Second Part.

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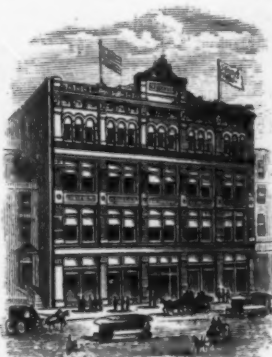
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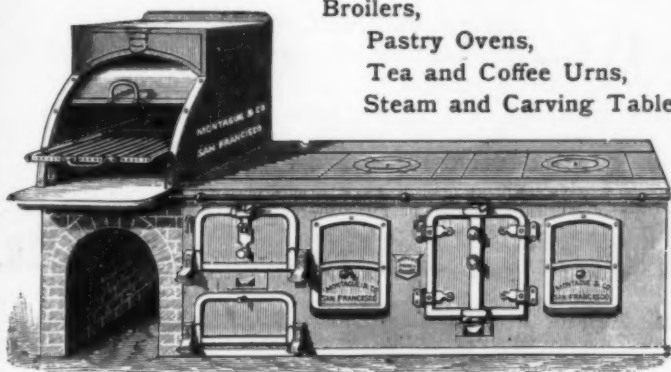
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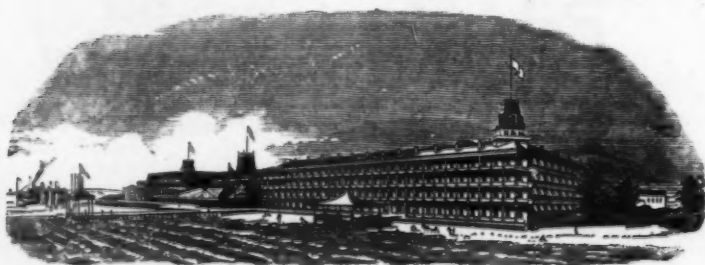
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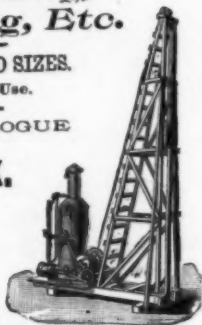
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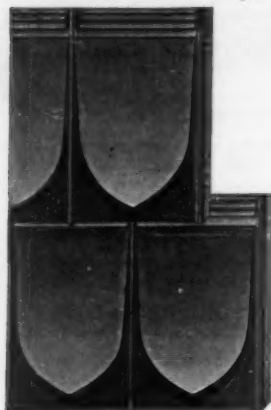
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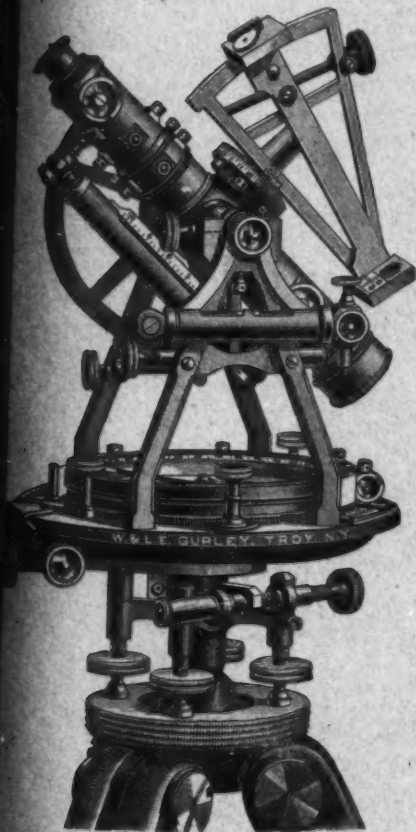
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Von Bülow

—AND—

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the Best Pianos
in America.

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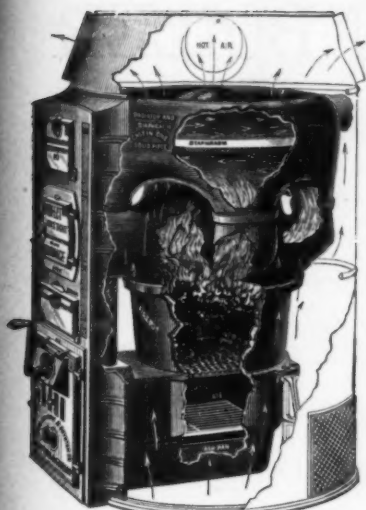
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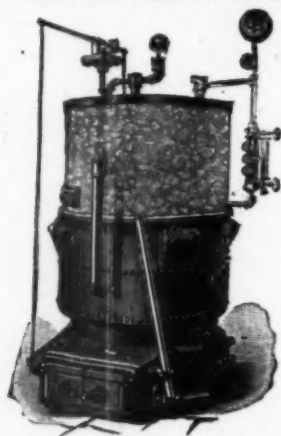
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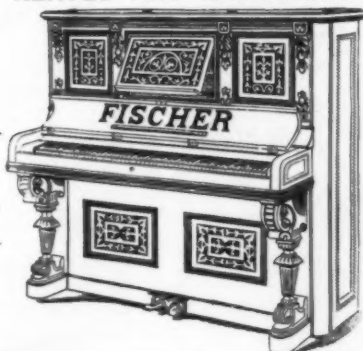
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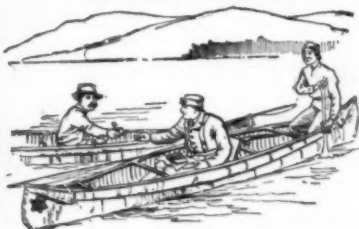
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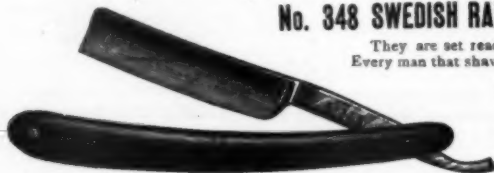
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ERRATA.

Page 443. for "The improvement of the Wisconsin and Fox rivers, and their connections, by means of a canal," read *The improvement of the Wisconsin and Fox rivers, and their connection by means of a canal.*

Page 443. 4th line from the bottom, for "show" read *shows*.

Page 451. 22d line, for "communication" read *communications*.

Page 456. 3d line, for "friendship" read *friendships*.

Page 461. 18th line, for "protection to this army," read *protection to the communications of this army.*



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NO. LVII.

THE MILITARY GEOGRAPHY OF CANADA.*

By LIEUT. ARTHUR L. WAGNER, SIXTH U. S. INFANTRY.

GOLD MEDALIST.

WHEN one nation finds itself at war with another, its statesmen and generals are at once confronted with the problem of so shaping the conduct of the war as to gain the greatest possible advantages from existing conditions; to encounter the forces of the enemy under such circumstances as to gain the greatest probability of success, to reap the greatest results from victory, and suffer the least from defeat; and, in brief, so to conduct the war as to lead to an honorable peace with the least outlay of blood and treasure, and to relieve their own people, as much as possible, from the burden of misery inseparable from the state of war.

As we know from our studies in the Art of War, the question which first arises is, whether to assume the offensive, or await the enemy in a defensive position. This, as Hamley says, will depend upon many considerations, to wit,—the relative strength of the opposing powers,—the political policy of the nation,—the relative capacity of the belligerents for the prompt mobilization and concentration of their forces,—or certain geographical considerations which may give to one, and deny to the other,

* A lecture delivered at the Infantry and Cavalry School by Lieutenant Wagner, Assistant Instructor in the Art of War.

the power of assuming the offensive. Then, if the offensive be chosen, comes the question of the selection of an object ; in which also political and geographical considerations enter ; the selection of a theatre in which the same considerations are to be weighed ; and finally the choice of a line of operations, in which geographical considerations are generally paramount, as affecting the all-important matters of supply, of the composition of the forces, and the general strategy of the campaign.

Taking these questions in their order, we find in the first a greater field, perhaps, for the diplomat than for the general ; in the second and third, military circumstances increase in importance ; and in the fourth, political considerations generally (though not always) vanish, and the solution depends upon military conditions alone. It is impossible, however, to weigh any of these questions without being influenced by geographical considerations, from the time the war-policy of the nation is discussed in the cabinet, until the problem is wrought out to a practical solution on the field of battle.

Hence arises the importance of the study of military geography ; which may be described as the study of geography with reference to the operations of armies ; and which, from its very nature, necessarily embraces many features of political as well as physical geography.

To a student of the Art of War, the study of the military geography of any country is an interesting one ; but it is, perhaps, only when the study is applied to countries whose interests are closely bound to our own, whose foreign policy may clash with that of the United States, and whose territories may be the theatre of operations of our armies—or to those parts of our own land which may feel the tread of the invader—that it becomes to us a study of importance second to no branch of the Art of War. Applied thus to the Dominion of Canada, the subject becomes one of great moment to every American officer.

British America embraces all of the North American continent north of the main portion of the United States, excepting Alaska and Danish America. With the exception of Newfoundland and Labrador, it is all comprised in the Dominion of Canada, which, with a population of only 5,000,000, has an area of 3,500,000 square miles—an area nearly equal to that of Europe. It comprises the provinces of Ontario, Quebec, New Brunswick, Nova Scotia, Prince Edward Island, Manitoba, and British Columbia,

and the territories known as Assinaboia, Saskatchewan, Alberta, Athabasca, North West Territory, Keewatin, Northern Territory, and North East Territory. A glance at the map shows us that this immense country is, roughly speaking, bounded on the east by the Atlantic Ocean, on the west by the Pacific, and on the south by the United States; while on the north its boundary is lost in the region of perpetual ice and snow. For us, the southern boundary of the Dominion is the only one which requires careful examination; for Canada is unassailable on the north, while she can be attacked on the east and west only by a nation superior to Great Britain in naval power—in other words, three sides of the irregular quadrangle which forms the Dominion of Canada are practically safe from assault.

The boundary line between the United States and Canada begins in Passamaquoddy Bay and follows the St. Croix River to its head waters; then goes due north to the St. John River, passes up the St. John to the mouth of the St. Francis River; ascends the latter river about thirty miles; then runs in a south-westerly direction on an irregular line (almost coincident with the crest of the watershed of the Atlantic and the St. Lawrence) to the 45th parallel of north latitude; along this parallel to the St. Lawrence River; up the St. Lawrence, Lake Ontario, Niagara River, Lake Erie, Detroit River, Lake St. Clair, St. Clair River, Lake Huron, and St. Mary's River to Lake Superior; through Lake Superior to the mouth of Pigeon River; up a chain of lakes and small rivers to the Lake of the Woods; then, from the outlet of this lake into Rainy River, across to the point known as the Northwest Angle of the Lake of the Woods; due south to the 49th parallel of north latitude; then, in a great sweep across the Continent, along this parallel, to the Gulf of Georgia; and then down this gulf, passing west of the San Juan Island, through the Juan de Fuca Strait, to the Pacific. One-third of this great boundary line consists of natural frontier.

The great physical divisions of the United States known as the Atlantic Slope, Pacific Slope, and Mississippi Valley, each with a more or less pronounced declination towards the equator, have in the Dominion of Canada their continuation or counterpart with a general slope towards the Arctic Ocean. The main chain of the Rocky Mountains, running parallel to the Pacific coast, marks the eastern boundary of the Pacific Slope of Canada; a region some 400 miles wide (from east to west) and 1500 miles

long, possessing "a mild and humid atmosphere as far north as the 55th parallel, but inhospitable and barren beyond the boundary." East of the Rocky Mountains lies the Great Northern Plain, the southern boundary of which is the watershed between the waters of Hudson's Bay and those of the Gulf of Mexico or the Great Lakes, and the greater part of which may, roughly speaking, be said to be coincident with the 50th parallel; while south of James Bay, the boundary between the Plain and the Atlantic Slope consists of the Height of Land and the Watchish Mountains, trending in a direction generally parallel to the St. Lawrence River, and about 250 miles from it. The greater portion of this region has been well described as a "bleak and bare waste overspread with innumerable lakes, and resembling Siberia both in physical character of its surface and the rigor of its climate."

The Pacific Slope of the Dominion may be dismissed from our consideration in a very few words. In one sense, British Columbia is more exposed to invasion than Canada proper, the boundary line being mainly an artificial one; but the roads leading across the frontier are few and poor, the only railroad in the province would not lend itself to the supply of an army operating from the south, and there is no objective in the main portion of the province of sufficient importance to justify military operations of any magnitude. The two points of special importance, Victoria (the capital) and Esquimault (the great naval station) are both on Vancouver's Island, safe from attack so long as England maintains her supremacy on the sea.

It is scarcely necessary to consider the Alaska-Canada frontier at all, though Colonel Strange in his able paper on the "Military Aspect of Canada" seems to regard Alaska as a possible secondary base for the Americans. If our navy were what we should like it to be, but what we may despair of its ever being, we might protect Alaska; but we could make no earthly use of it as a base, owing not only to the difficulty, under the best conditions, of transporting an army thither, but to the absence of any sane objective after we got there. Under existing conditions, if war should occur between the United States and Great Britain, our flag would, doubtless, be speedily lowered in Alaska, to be raised again only as a result of American victories in other theatres.

The Atlantic Slope of Canada comprises all the older, more populous, and wealthier provinces of the Dominion. In it would lie all the important theatres of war if we were engaged in a con-

flict with Great Britain ; and a consideration of its geography is, therefore, a matter of especial consequence to the American military student. This portion of Canada embraces the provinces of Ontario, Quebec, New Brunswick, Nova Scotia and Prince Edward Island ; though the last named province may be neglected as not lying within any probable theatre of operations.

Mountains.—Quebec is generally mountainous. The portion of this province lying south of the St. Lawrence is traversed through almost its entire length by the Notre Dame (or Green) mountains, a continuation of the Appalachian range, running almost parallel to the St. Lawrence River, and terminating at the Gulf of St. Lawrence in a high table-land having an elevation of 1500 feet. The highest peaks of these mountains are about 4000 feet high.

North of the St. Lawrence the Laurentian Range, beginning in Labrador, trends in a south-westerly direction, and skirts the north shore of the great river to the vicinity of Quebec, where it leaves the banks of the stream. It then keeps nearly parallel with the river, but some miles back from the shore, until about thirty miles west of Montreal, where it skirts the Ottawa River for a hundred miles, leaps the river, as it were, and trends in the direction of Kingston. From the vicinity of that city, the range extends north-westward to the shores of the Lakes Huron and Superior, and finally tapers off into the levels of the Great Northern Plain. "Some of the hills of the Laurentian Range are 1300 feet high, and below the city of Quebec their altitude is 3000 feet."

In the northern and northwestern portion of New Brunswick are several hill ranges, of altitude varying from 1200 to 2000 feet. In the southern part a considerable range of hills runs almost parallel to the coast of the Bay of Fundy, and at a distance of 20 or 30 miles from it.

In Nova Scotia are several chains of high hills (some having an altitude of 1100 feet) running generally parallel to the coast. These hills lie nearer to the coast of the Bay of Fundy than to that of the Atlantic. The principal chain, known as the Cobequid Mountains, runs east and west, parallel to the path by which an invading army would enter from the isthmus joining Nova Scotia and New Brunswick, and thus might have a strategic value of some importance.

Topography and Products.—The southern, or most populous,

part of Ontario is, generally speaking, a plain; though it is rather undulating, and along the shores of Lakes Erie and Ontario is in many places broken by shelving rocks and precipices. The province is often termed "The Garden of Canada," and is a region of surpassing fertility. Its average yield of wheat, oats and barley exceeds that of our best States. It produces fruits of various kinds in great abundance, is without a superior as a sheep-raising country, and its exports of cattle and bread-stuffs are large.

The province is generally well cultivated, and has fairly good roads. On the whole, it is well suited to military operations. The heavily timbered region lies almost altogether north of the probable theatre of operations; and the products of the province would greatly facilitate the supply of an invading army.

In the province of Quebec, wheat, barley, oats, rye and hay are produced in large quantities, and the exports of cattle and beef are considerable. "Dense forests cover enormous tracts of territory," and the province, as a whole, is heavily wooded. The country has a great number of good wagon roads. Artillery could thus be easily transported; but, owing to the mountainous and wooded nature of the province, an invading army would, doubtless, require a minimum of artillery and cavalry and a maximum of infantry. The products of this province, too, would greatly facilitate the supply of armies operating in it.

Except in the mountainous regions already referred to, the surface of New Brunswick is generally undulating. Though the country is not infertile, the agricultural products are not sufficient for home consumption. Hay is produced in great quantities, but the province is not suited to the operations of cavalry or the extended use of artillery, being one of the most heavily wooded regions in the world. The supply of an invading army would receive scanty assistance from the products of this province, and its operations would be impeded by natural features which would lend great advantages to the defense.

Nova Scotia is a more productive province than the one just considered, cereals and fruits growing in abundance. The country contains extensive forests, but its roads are numerous, and of excellent quality. The obstacles that would be encountered by an invading army would, however, be found in other natural obstacles than those yet considered.

Rivers.—The waterways of Canada, whether we consider the

creations of the Almighty or the work of man, demand the chief attention of any one who considers the Dominion either from a commercial or military point of view. No country in the world has a more complete system of water communication. First of all is the St. Lawrence River, draining the Great Lakes and extending from its head at Lake Ontario 728 miles to the Gulf of St. Lawrence. This noble stream, which from its very source is a river of the first magnitude, has an average width of about one and three-fourth miles from Montreal to Quebec, narrowing to three-fourths of a mile at Cape Diamond near the latter city. Seven miles below Quebec it is 4 miles wide; 22 miles farther down the width is 11 miles; at the mouth of the Saguenay it expands to a width of 16 miles; and at Cape Chat it has a magnificent sweep of 30 miles from shore to shore. The largest ocean vessels can ascend to Montreal.

We may regard the Saguenay River as part of the eastern boundary of the possible theatre of military operations in Canada. Above this river are many others emptying into the St. Lawrence; the principal ones on the north being the Montmorency, the St. Anne, the Batiscum, the St. Maurice, the Du Loup, the Assomption, and the great tributary, the Ottawa, 600 miles long, with its tributaries Du Nord, Petite Nation, Du Lievre and Gatineau on the north, and the Petewawa, Bonne Chere, Madawaska, Mississippi and Rideau on the south. The St. Lawrence river system is completed by numerous tributaries on the south, of which the principal ones are the Richelieu, the Yamaska, the St. Francis, the Beconcour, and the Chaudière.

Emptying into Lake Ontario on the Canada side are the Moira and Trent rivers; into Lake Erie, the Grand River; and into Lake St. Clair, the Thames and the Sydenham. With the exception of the last two rivers, the courses of these tributary streams are all perpendicular to the path of an invading army from Detroit to Quebec on the left of the St. Lawrence—or from Rouse's Point or Montreal, on the right of the great river to the same objective.

Among the rivers of the eastern provinces of Canada, the St. John is the most important. Navigable for large vessels as far as Fredericton, 88 miles from its mouth, and with its course partly perpendicular and partly parallel to a line of operations east from Maine, it might, in the event of a war with Great Britain, play a great strategical part which we will consider later. The Restig-

ouche, Mirimichi, and other streams in the northern part of New Brunswick lie too far out of any probable theatre to call for notice. At the head of the Bay of Fundy is the Petitcodiac River, navigable for ships 25 miles from its mouth, and for schooners of 80 tons burden 12 miles further. From the head of ship navigation it is less than 15 miles across the isthmus to Shediac Bay, measured from the points Moncton and Shediac which are connected by rail. Thirty miles further to the east, the same isthmus again narrows its width, from Cumberland Basin to Bay Verte being about 15 miles. Two excellent positions are thus made to order, as it were, and we shall in a proper place, consider their great military value.

As to the rivers of Nova Scotia, we will only note that in mapping out a route from the isthmus to Halifax, we find the path crossed by the Philip, Wallace, Salmon, and Shubenacadie rivers, while the line of the invading army would be parallel to the general direction of the Stewiacke and Musquodoboit. All these rivers are navigable for small craft, and the Shubenacadie is navigable for vessels of large size.

Canals.—Let us now consider the admirable system of canals, by which the defects of the natural system of Canadian waterways have been remedied, and its advantages increased. Immediately above Montreal the navigation of the St. Lawrence is obstructed by the St. Louis or Lachine Rapids. Other rapids obstruct the navigation of the river between Montreal and Prescott (about 100 miles above), the total fall of the river from the latter to the former city being $206\frac{1}{2}$ feet. These obstacles are overcome by means of the St. Lawrence canals, which consist of the Lachine Canal, $8\frac{1}{2}$ miles long; the Beauharnois Canal, $11\frac{1}{2}$ miles long; the Cornwall Canal, $11\frac{1}{2}$ miles long, and the Williamsburg Canals, three in number, aggregating $12\frac{1}{2}$ miles in length, or $27\frac{1}{2}$ miles including intervening spaces of river navigation. The total length of these canals is $43\frac{1}{2}$ miles. The Lachine Canal is on the Island of Montreal. The Beauharnois, about 25 miles above Montreal. The Cornwall is about 45 miles, and the Williamsburg about 18 miles, below Prescott. The locks of the Lachine Canal are 270 feet in length by 40 feet in width, with a depth of 14 feet, and the upper canals are being enlarged correspondingly. These canals will then render practicable the passage of vessels of large size, as far as Prescott. Above that city the navigation of the St. Lawrence is without obstruction, and vessels

can pass through Lake Ontario to Port Dalhousie, the outlet of the Welland Canal. This canal gives a passage from Lake Ontario to Lake Erie, which would otherwise be barred by the impracticable Niagara River, and is 27 miles long. Its locks are 275 feet long by 45 feet wide, and the depth of water on the sills is, or was, 12 feet. The work of deepening the canal was begun nearly five years ago, and vessels of 14 feet draught will soon be able to pass through the canal, if indeed they cannot already do so. On emerging from the Welland Canal at Port Colborne, a vessel can pass without hindrance up the lakes as far as Chicago on the one hand, or the St. Mary's Canal on the other. A canal at Sault Ste. Marie, a mile long and 17 feet deep, gives a passage into Lake Superior; but as this canal belongs to the United States, and could easily be destroyed if it could not be defended, we may regard Lake Superior as safe from naval menace. The other lakes, however, are open to any vessel of the British navy that can pass through the canals mentioned; in other words, when the improvement of the canals is completed, they will be open to any vessel drawing less than 14 feet of water. Including the vessels now building, England has just one hundred and forty-six such vessels, three of them armored.

With one exception, all the British canals mentioned lie on the left side of the St. Lawrence. The Beauharnois Canal, which is south of the St. Lawrence and only 20 miles from the northern boundary of New York, is the weak link in the chain of canals, as its defense would be difficult, and its capture fraught with serious results to the British Empire.

This fact is recognized by Great Britain; and steps are being taken to remedy the serious defect by which the seizure or destruction by the Americans of a canal less than 12 miles long might absolutely prevent the reinforcement of the British naval forces on the lakes, or its withdrawal in case of disaster. The Rideau Canal gives a water passage from Kingston to Ottawa, and thence down the Ottawa River and Lachine Canal to Montreal. This canal does not at present admit of the passage of vessels of a draught greater than four and one-half feet, and is, consequently, of no strategic importance. It is a significant fact, however, that it was constructed, sixty years ago, "with a view to the defense of the province," and that its enlargement is contemplated. Its new locks will have a depth of nine feet, and will accommodate fifty-four vessels now on the list of the British

navy. But even when the enlargement of the Rideau Canal is completed, its strategic importance will be less than that of the proposed Ottawa and Georgian Bay Canal, by which vessels will be able to go from Montreal (by the Lachine Canal, Ottawa River, Lake Nipissing, French River, and Georgian Bay) into Lake Huron. To obtain the fullest strategic value of the latter canal the construction of two others is requisite, and both are now under consideration by the Dominion Government. One of these canals is to connect Toronto with Georgian Bay by way of Lake Simcoe, the other is to join Hamilton with Port Franks on Lake Huron. With these canals completed, the loss of the Beauharnois Canal could be regarded by the British with comparative complacency.

The Trent River Navigation is "composed of a chain of lakes and rivers extending from Trenton, at the mouth of the Trent, Bay of Quinte, north shore of Lake Ontario, to Lake Huron." This system may be dismissed without serious consideration. It does not admit of the passage of vessels of a draught of five feet; and as it would confer no strategic advantages not obtained by canals just mentioned, and as it seems in its present condition to answer all the demands of local traffic, its enlargement does not seem probable.

There is another waterway of less importance, perhaps, than the Welland and St. Lawrence canals, but which may nevertheless be of great value to Great Britain, or perhaps to the United States, in case of war between the two nations. Forty-six miles below Montreal is the mouth of the Richelieu. This river is navigable up to Lake Champlain, by means of a dam and lock at St. Ours (14 miles above the mouth), and the Chambly Canal, 12 miles long (32 miles farther up), for vessels drawing six and one half feet. A new canal is proposed from Caughnawauga, on Lake St. Louis, to connect with the Chambly Canal, thus admitting of quick water transport from Montreal to Lake Champlain via St. Johns. The Chambly Canal is to be enlarged to the same dimensions as the Welland, and the new canal is to be constructed on the same scale. The possession of the Richelieu canal system would give to the British navy access to Lake Champlain—a fact sufficient to demonstrate its importance.

It is evident that while the Canadian canals are admirably adapted to the requirements of commerce, their projectors did not labor under the idea that disputes between the United

States and Great Britain were always sure to be settled by arbitration.

Railways.—The Canadian system of water communication is supplemented by an extensive system of railways, the most important of which have a general direction almost parallel with the general course of the waterways. Stretching across the continent, from Halifax* to Vancouver, with a total length of about 3600 miles, is the Canadian Pacific Railroad. This road, in commercial aspects one of the greatest in the world, is furthermore of great strategical value to Great Britain. If left intact, it could, in conjunction with the Pacific steamers, in the space of forty days, transfer troops from the banks of the Ganges to the shores of the St. Lawrence; and would enable England speedily to place an Anglo-Indian army anywhere in Canada. But, fortunately for us, the portion of the road from Lake Superior to the Pacific runs parallel to our boundary and within easy striking distance of it; while the branch from Montreal to Halifax not only lies on the wrong side of the St. Lawrence for safety, but a part actually lies within the borders of the State of Maine. Col. Strange, writing more than a decade ago, says: "I have not taken note of the wilderness between Lake Superior and the Pacific, as it can scarcely be said to contain a military objective; an army could not subsist in it, and in any case we could not defend it, unless the Canadian Pacific Railway is constructed."

Since Col. Strange wrote the railway has been constructed. It now furnishes in itself an objective in the region referred to, and from the very situation of the road, all the efforts of the British Empire probably could not save it from the destructive forays of cowboys from Montana and North Dakota. The Montreal and Halifax branch would, so far as being a part of the system of British communications is concerned, cease to exist as soon as war was declared. But the strategic value of the Canadian Pacific, though greatly impaired by these conditions, is still very great. A great arm of the road runs from Windsor, through Toronto and Montreal, to Quebec, with branches extending to Hamilton, Kingston, Brockville, Prescott and Ottawa—in brief, connecting the most important strategic points of the Dominion by a railroad behind the great natural wet-ditch of the Canadian fortress. Of secondary, but not insignificant importance, is that

* From Moncton, N. B., the Canadian Pacific trains run to Halifax over the Intercolonial R. R.

portion of the main line between Montreal and Port Arthur, on Lake Superior, with its branch from Sudbury to Sault Ste. Marie. This part of the road is connected laterally by a branch of the Grand Trunk from North Bay (on Lake Nipissing) to Toronto, and a small road from Renfrew to Sharon Lake.

The Michigan Central R. R., after leaving the boundary of the United States, runs from Windsor to Welland, at which point it branches to Buffalo on the right, and to Clifton and Niagara on the left. From St. Clair Junction a branch extends to Courtright on St. Clair River, from St. Thomas a short branch runs to London, and from two points, not far from Detroit, branches run respectively to Amherstburg and Sea Cliff Park, both on Lake Erie. On the outbreak of war between the United States and Great Britain, the rolling stock of this road might, perhaps, be speedily assembled on American soil; but the Canadian part of the road would still exist as a part of the British lateral communications.

We will next consider the Grand Trunk Railway, which is, perhaps, the most important of all. One branch of this road runs from Windsor to Fort Erie; another, from Sarnia to Hamilton and Niagara Falls, and a third, from Sarnia, through Toronto, Kingston, Brockville and Prescott to Montreal. These branches are joined laterally by a number of railways belonging to the same system, which not only connect the main lines, but are extended to points on Lake Huron, Georgian Bay, Lake Nipissing and various points in the interior of Ontario. From Coteau Junction a branch runs to Ottawa. From Montreal the main line continues to Richmond, at which point it divides into two branches, one running to Portland, Maine, and the other to Levis, opposite Quebec. From the latter branch is a sub-branch running from Arthabaska to a point opposite Three Rivers. It is evident that the part of this road, east of Montreal, loses much of its strategic value, as it lies on the wrong side of the St. Lawrence for safety, and a portion of it lies within our own territory.

At Levis, the Grand Trunk unites with the Intercolonial R. R. The latter road follows the St. Lawrence for more than a hundred miles, then turns to the right, skirts the upper part of Chaleur Bay, and continues in a southerly direction to Halifax. At Moncton the road branches east to Point Duchene (near Shediac on Northumberland Sound) and west to St. John, N. B. From Truro, N. S., the "Eastern Extension" runs to Mulgrave Wharf

on the Strait of Canso. It is evident at a glance that the Intercolonial R. R. would be of great value to Great Britain in case of war with this country, as a means of preserving lateral communication between the New Brunswick and St. Lawrence theatres.

From St. John, N. B., the New Brunswick R. R., as far as its junction with the Maine Central, forms a part of the Canadian Pacific. Through Fredericton a branch of the N. B. R. R. connects the Intercolonial and Canadian Pacific. Another branch from the same city and one from St. Andrews unite at Newburg Junction (near Woodstock), and the road then continues near, and in the general direction of, the Maine frontier as far as Edmundston; a continuation from that point to Rivière du Loup being now in process of construction.

The roads mentioned comprise all the principal railways of the Dominion, and are the strategic railroads *par excellence* of Canada. There are a few other lines, but they are so short, and their military value is so insignificant, that a description of them would only tend to confuse the subject, without adding any information of importance.*

The Strategic Ensemble.—Bearing in mind the directions and relative positions of the waterways and railroads just described, we can appreciate the appositeness of Colonel Strange's description of the country in question. "Canada," he says, "is a long strip of communications, its main artery, the St. Lawrence, being the fosse of a natural fortress, open during the summer season (winter operations may be deemed impracticable in this climate) to the gunboats of Great Britain, and to them alone as long as the fortress of Quebec is kept in defensive condition. * * * * * The Grand Trunk Railway and others on the south shore are now supplemented by railways on the north shore of the St. Lawrence and the lakes, with their usual telegraphic lines, the whole forming a series of communications which have always enabled Canadian troops to act upon what are practically interior lines, and so concentrate readily upon important strategic points, as was proved in the late Fenian raids."

That Colonel Strange is right in saying that the St. Lawrence is open to British gunboats, and to them alone, as long as the fortress of Quebec is kept in a defensive condition cannot be denied.

* In the article "Canada," the Encyclopædia Britannica (Ninth Edition) mentions eighteen Canadian railroads. All the important roads there mentioned are included in the railway systems described above.

The treaty of 1817 limits the naval force to be maintained by the United States and Great Britain to the following vessels on each side, namely :

On Lake Ontario, one vessel, not exceeding one hundred tons burden, and armed with one eighteen pounder cannon ;

On the upper lakes, two vessels not exceeding like burden each, and armed with like force ;

On the waters of Lake Champlain, one vessel not exceeding like burden, and armed with like force.

Each nation is also forbidden by the treaty to build vessels of war on the lakes.

It would, therefore, be impossible for the United States to place a fleet of gunboats on the lakes without sending them around (by way of the ocean and the St. Lawrence) past Quebec ; for we cannot build gunboats on the lakes in time of peace without such violation of the treaty as to furnish a *casus belli* ; and after war breaks out the opportunities for unmolested naval construction are gone. Quebec is strongly fortified, and can be further strengthened to such a degree that nothing larger than a bird could pass by on the river without the permission of the British commandant. England, on the contrary, could assemble a great fleet on the St. Lawrence without violating the treaty, and, at the first sound of war, could send it thence through her own canals into the great lakes.

The disadvantage under which this unfortunate treaty places us can be overcome only by a careful preparation, in time of peace, of strategic canals within our own borders. The enlargement of the Erie Canal (including the Oswego branch) would enable gunboats to pass from the Hudson into Lake Erie and Lake Ontario. The Oneida Ship-canal would also be of great value. The proposed route for this canal is from Oswego by means of the Oswego Canal to a point near Phoenix ; thence by means of a new canal and the Oneida River to Oneida Lake ; thence by the lake and the Oneida Canal to the Erie Canal at Durhamville. The enlargement of the Champlain and Erie Canal (from Lake Champlain to the Hudson) or the construction of a new canal from Whitehall to Fort Edward would be of very evident strategic value.

The Hennepin Ship-canal is designed to connect the Mississippi with Lake Michigan. The proposed route for this canal is from Watertown, Ill., to Hennepin, then by the Illinois River

(14 miles) to La Salle, and from that point to Chicago, via the Illinois and Michigan Canal enlarged.

The improvement of the navigation of the Wisconsin and Fox rivers, and their connections, by means of a canal would unite by water Prairie du Chien and Green Bay—in other words, it would give water communication between the Mississippi and Lake Michigan.

All these plans seem to have been more or less seriously contemplated by our Government, and the construction or improvement of the canals in question may be hoped for. It is a significant fact, however, that the advocates of the improvements in our internal waterways seem to consider the commercial advantages alone—advantages so marked that the most bitter opponents of the canals are those who are working in the interests of the railroads; and the strategic value of the canals (like most of other military matters) seem to have been generally ignored by our people.

Yet the strategic value of the canals would be beyond computation. Our naval depots for the lake fleets could be established in safety far within our own borders; and in case of war an armada of gunboats could be sent from the Mississippi into the Lakes a full month earlier in the year than a similar naval force could be sent thither from the Gulf of St. Lawrence. The canals joining the Mississippi and the Lakes are not designed, however, to have a depth equal to that of the Canadian canals; the minimum depth of the Hennepin Canal being specified at eight feet, and that of the Winconsin Canal at five.

The Ohio and Erie Canal (from Portsmouth to Cleveland), and the Miami and Erie Canal (from Cincinnati to Toledo) could not easily be sufficiently enlarged to serve as ship-canals.

We may, however, question the correctness of Colonel Strange's judgment in deeming winter operations impracticable in Canada. Our own troops have endured, in winter campaigns in Montana and the Dakotas, weather of greater severity than they would be called upon to face in most parts of Canada; and the all-but-successful campaign against Quebec made by the ill-clad and half-starved soldiers of Montgomery and Arnold, who conducted siege and assault late in December, show that "Field-Marshal Frost" is not such a formidable British ally as Colonel Strange would have us believe. In fact, without a naval superiority to Great Britain, our best hopes of success must be found

in a winter campaign. I am by no means inclined to underestimate the hardships and difficulties of a campaign in the terrible rigor of a Canadian winter; but I shall endeavor, further on, to show that a winter campaign in the Dominion would be attended with results that could scarcely be hoped for in summer.

Climate.—Although Canada is always regarded as a cold country, its climate is one of extremes of heat and cold. The climate at Toronto varies from 12° below to 91° above zero, Fahrenheit. At Montreal the limits are 17° below and 96° above. At Quebec the thermometer ranges from 24° below to 91° above zero. At Halifax the lowest point is 9° below, the highest, 88° above; while the greatest extremes of heat and cold seem to be found at Fredericton, N. B., where the mercury has been known to drop in winter to 35° below zero, and in summer to rise to 100° above.

Cities.—The cities of Canada are so well known that nothing but a brief description of them is here requisite.

First in commercial importance is Montreal (situated on an island of the same name) having a population of 140,000, and covering an area of eight square miles. The St. Lawrence is here crossed by the celebrated Victoria Bridge, an iron tubular structure nearly two miles long, supported on twenty-four piers of solid masonry. As a railroad centre, the head of unimpeded ocean traffic, the outlet of the Canadian system of canals; in brief, as the connecting link between the ocean and the Lakes, Montreal is a point of immense commercial and strategical value, and has been termed "the key and the capital of Canada." In strategic importance it is second to Quebec alone.

Toronto (population 86,000) is, in commercial consequence, the second city of the Dominion, and is the capital of Ontario. It owes its importance to its excellent harbor on Lake Ontario and to the junction here of several important railroads. It is also a considerable manufacturing city.

Quebec, the capital of the province of the same name, has a population of 62,000, and is thus the third city in Canada. From a strategic point of view, it is the most important place in the Dominion, completely controlling the St. Lawrence, to which it can admit friendly vessels and from which it can bar out all hostile fleets. The history of every war fought on Canadian soil shows that the possession of Quebec is essential to the mastery of Canada. The place is described as "the most picturesque and the most strongly fortified city on the Continent." It was formerly a walled

city, but several of the old fortifications have been demolished, and some of the gates have been removed. The chief fortification is the Citadel, which stands on Cape Diamond, 333 feet above the river, and covers an area of forty acres. A large factory for the fabrication of small-arm cartridges and artillery projectiles is located at Quebec. The harbor of the city is excellent, and its extensive docks are among the best in the world.

Hamilton, Ontario, is a considerable manufacturing centre, has a good harbor on Lake Ontario, and is the junction of several railroads connecting it with Lake Erie, Lake Huron and Georgian Bay. The population of Hamilton is 35,000.

Halifax (population 34,000), is the chief city of Nova Scotia. It has an excellent harbor, and is the winter port for the Dominion of Canada—the St. Lawrence being frozen over in that season. The hill on which the city stands is commanded by a citadel a mile in circumference and of great strength, and the harbor is defended by several forts and batteries. It is the only place in the Dominion which still has a garrison of British regular troops, and it is a naval station of great importance.

Next in size is St. John, the chief city of New Brunswick, with a population of 29,000. It has an excellent harbor, which never freezes, and which is protected by strong batteries. It is a port of importance, a considerable manufacturing city, and has good communications with the interior by means of the Intercolonial and New Brunswick railroads.

Ottawa, on the Ottawa River, is the capital of the Dominion. Like the city of Washington, its importance rests almost exclusively upon its character as the political heart of the country. Its population is 27,412.

Kingston owes its strategic importance to its situation on Lake Ontario at the point where the St. Lawrence issues from the lake, and to its location at one extremity of the Rideau Canal. It is an important naval station, and its population is 14,000.

London, Ontario, (population 20,000) is of considerable importance as a railroad centre, as are also Guelph and Stratford, in the same province. Sarnia on St. Clair River, and Windsor, opposite Detroit, are, from their positions, of some strategic importance.

Population.—The population of Canada may be broadly divided into two great classes—Anglo-Saxon and French. The former class consists mainly of the descendants of early British colonists

in Nova Scotia and New Brunswick, of later immigrants, and the descendants of Tories who emigrated from the United States to the British provinces after American independence had become assured. The Anglo-Saxon Canadians resemble, in most respects, the people of our Northern States. They are energetic, enlightened, progressive and independent; and to them the prosperity of the Dominion is almost altogether due.

The French Canadians are descended from the old colonists of the days of Frontenac and Montcalm, and now number about 1,083,000. They are limited mainly to the province of Quebec, of which they furnish the great bulk of the population. They resemble their Anglo-Saxon compatriots in thrift, but in scarcely anything else. They are slow, conservative, and as completely priest-ridden as the peasantry of Spain or Bohemia. Secured in their own language, laws, and religion by the treaty of Paris in 1763, their manners and customs have remained unchanged, and the province to day presents the appearance of a portion of France under the folds of the British flag—but it is the France of Louis Quinze and has nothing in common with the Republic of President Carnot. Ever since the conquest of Canada the French Canadians have been loyal to the British crown; but theirs has been the loyalty of self-interest rather than affection, and has been largely a matter of obedience to their church, which has in Quebec an influence, authority and sway, such as no church has in any other part of the British Empire. Industrious and humble, the typical French Canadian passes a monotonous existence in working hard, saving money, hearing mass, and obeying the biblical injunction to propagate and multiply. As a result, the population of Quebec not only steadily increases, but overflows into New England, where in some localities it is beginning to root out the native population; for a French Canadian can grow rich on wages that would mean starvation to an American. Many of these people return to Canada; and there is a constant passing to and fro which serves to bind the province in sympathy with its great neighbor, and doubtless engenders in a considerable degree such friendship for the United States as grows out of the natural affection of a man for his treasury. Though this friendship springs spontaneously from the pocket-book rather than the heart, it is perhaps none the less potent for that reason; and it may, and doubtless does, inspire the population of Quebec with an aversion to war, and a desire for peace, with the United States.

In addition to these two great classes of population there are many Irish, English, Scotch, Germans, Dutch and Americans in Canada, besides a considerable sprinkling of Welsh, Scandinavians, Icelanders and Russian Mennonites. The ubiquitous African is found in the Dominion to the extent of 22,000, being mainly a sombre reminiscence of the ante-bellum "underground railway."

Military Forces.—I cannot, within the bounds of this article, give an extended description of the military forces of Canada. We must, however, have some knowledge of the strength and composition of the enemy's armies before we can utilize our geographical knowledge in deciding upon a general plan of campaign.

The militia of Canada is divided into four classes, as follows:—

1st class: Unmarried men and childless widowers from eighteen to thirty years of age.

2d class: Unmarried men and childless widowers from thirty to forty-five years of age.

3d class: Widowers with children and married men from eighteen to forty-five years of age.

4th class: Men from forty-five to sixty years of age.

This force is divided into active and reserve militia.

The active militia consists of 1987 cavalry, 1440 field artillery, 2342 garrison artillery, 243 engineers, and 31,388 infantry, giving a total of 37,400 men, all of whom are taken from the first class. If a sufficient number of men is not obtained from that class by volunteering, the quota is filled by draft. The period of training is only twelve days each year.

The active militia would probably be immediately available at the outbreak of war, as their mobilization could be quickly effected; for the Canadian government has so far adopted the German system as to divide the Dominion into twelve military districts, each of which is sub-divided into regimental and company districts—each district and sub-district having its own commanding officer and staff, its muster-rolls prepared, and everything in readiness for prompt mobilization. The concentration and supply of these forces would, however, be a matter of great difficulty; for "the weakest spot in the Canadian militia system is the total absence of any nucleus of transport."

If the Canadians were to accomplish feats of organization and mobilization equal to those of the Germans, and were to call out

the four classes of their militia, they might produce an army of 800,000 men. But such results are obtained only when popular clamor absolutely demands war; when each man feels that his religion, his well-being, or his personal freedom is in jeopardy; or when, from some great cause, his combativeness has been roused to the highest degree. The presence of people in Canada favorably disposed to the United States, of those actually hostile to Great Britain, of internal difficulties owing to racial antipathies, and of many other conditions, must be ignored if we imagine this great aggregate possible.

It is more probable that the first call would bring out about 40,000 Canadian militia. New England, the Middle States, Ohio, Indiana, Michigan, Wisconsin and Illinois, could at once oppose them with nearly 60,000 organized militia; and there is no reason to believe that an Anglo-Saxon militiaman reared on the banks of the St. Lawrence is in any way superior to an Anglo-Saxon militiaman born and bred on the banks of the Hudson or the Illinois. The Canadian militia has, doubtless, improved since the day when the "Queen's Own" of Toronto ran away from the Fenians; the American militia is certainly better than it was when it fled from the field of Bladensburg. The Canadian active militia would, doubtless, be increased more or less from the reserve. Under the stimulus of victory it might even grow into a formidable army; but under the depressing influence of defeat it would suffer the disintegration of all militia armies in adversity.

Colonel Strange expects entirely too much, I think, from the militia of the Dominion. He says of Canada: "The history of her struggles against invasion showed that she could and did, with the assistance of but few British troops, bear the brunt of it with her militia, who, almost unaided, rolled back the tide of war from her shores. Before the conclusion of the Treaty of Peace of 1814-15, not a single American post or sentry remained on the Canadian shore, while we were in possession of Fort Michilimachinac and other points in what is now the State of Michigan."

We may as well take issue with Colonel Strange right here as to the accuracy of his historical statements. Canada was *not* defended by her militia, "with the assistance of but few British troops." In 1814 it was defended by a body of veteran British regulars exceeding in number the largest army that the United States ever placed on the Northern Frontier; and while the im-

potence of our attempts to conquer Canada,—owing to incompetent generals, a misplaced reliance on militia, perverse governors thwarting the efforts of the National Executive, and the influence of a powerful peace party,—must ever be a source of mortification to every true American, we may remind Colonel Strange that American soldiers more than once saw the backs of troops who had passed victoriously through the carnage of Badajos and had stood in triumph on the bloody field of Salamanca.

In a recent paper by Colonel Strange on "Canadian Defense," reprinted in the number of the JOURNAL OF THE MILITARY SERVICE INSTITUTION for January, 1891, that gentleman speaks of the militia law of Canada as "theoretically perfect;" but adds that "its practical result depends upon its administration, which, from the meagre pittance applied by Parliament, is faulty."

In 1885 the Canadian government mobilized a force of 5500 men by an order dated March 27 of that year, and in two weeks had concentrated it in the Saskatchewan valley. A speedy suppression of the Riel rebellion was the result. From the small number of troops called out, this prompt action was, however, hardly a fair indication of the time that would be required for the mobilization and concentration of the entire militia force of the Dominion. An anonymous but able Canadian correspondent of the MILITARY SERVICE INSTITUTION in an article on "Mobilization and Concentration of the Canadian Militia," published in June, 1887, estimates that a total militia force of 81,900 men could be assembled for the defense of the frontier line from Quebec to Detroit; but he adds, "the complete work of mobilization, from the raising of men through all the stages of arming, equipping, clothing and combining into units, up to the final concentration at the strategic points, would occupy an interval of time which could only be calculated by months." A paper in the same magazine for December, 1886, gives a description of the annual training of the Canadian militia, from which I infer that those troops are not one whit superior in efficiency to our own organized National Guard. Of the twelve days training each year it seems that one day is consumed in reaching camp, one in leaving it, one in marching through town on a holiday parade, and one in sham-battle nonsense, leaving only seven days for real military work, Sunday being, of course, a day of rest.

I am not inclined to underestimate the fighting capacity of the Canadians—their history shows them ever to have been a brave

and warlike people—but their forces are merely militia, which could become really efficient only in the course of many months of successful (or at least not disastrous) war. The military importance of Canada lies in the fact that it is a base for the military operations of a powerful empire which controls the ocean and is capable of putting forth great strength on land.

The regular army of Great Britain consists, in round numbers, of 200,000 men. The Regular Army Reserve, the Militia, the Volunteers and the Indian Native Army swell this force to a total war strength of 772,000 men, without including 14,000 armed constabulary in Ireland, and 190,000 native military police in India. Of course this force could not all, nor even a great portion of it, be concentrated on any one theatre; for the vast extent of the British Empire and the smouldering discontent of millions of British subjects require the distribution of this huge army among many different regions of the globe. We know, however, that England easily sent 40,000 regular troops to Egypt in 1882, and there is no reason to doubt that she could, without sacrificing her security in other quarters, place in Canada two highly organized, perfectly equipped, and thoroughly efficient army corps and a division of cavalry.* She could spare these troops, and there is no doubt that she has abundant transportation for them. Great Britain could, then, begin the American war with some 70,000 regular troops—the best in Europe—and about 40,000 militia. We could oppose this army at first with 25,000 regulars and 106,000 organized militia. Our ultimate preponderance in military strength cannot be doubted; but I do not share the views of those who think the conquest of Canada would be a military promenade for the American army.

EFFECT OF THE GEOGRAPHICAL CONDITIONS UPON MILITARY OPERATIONS.

As a means of forming an estimate of the military value of these various conditions of the physical and political geography of Canada, let us suppose that a war has broken out between the United States and Great Britain. The first question, "Shall we

* Colonel Maurice in "The Balance of Military Power in Europe," says that the British Government is aiming to "work up to the standard * * * of putting two army corps and a cavalry division into a condition for effective action abroad." As to the practicability of being able to reach that standard, Colonel Maurice does not seem to entertain the slightest doubt.

assume the initiative, or wait in a defensive position the assault of the enemy?" is quickly answered. As to our Atlantic, Gulf, and Pacific sea-board, circumstances plainly demand the adoption of the latter course. As to Canada, the natural aggressiveness of our people, combined with a confidence born of our traditions, will demand the adoption of a vigorous offensive.

In the selection of an object, it is of paramount importance so to direct our efforts as to isolate the Canadians as much as possible from Great Britain, and to separate the different provinces from each other. Quebec is the most important objective, for its possession by us would prevent the naval or military reinforcement of the British armies or fleets above that point, and history proves that it is the key to the conquest of Canada. Though we should therefore regard Quebec as our ultimate objective, we cannot make it our immediate one. The old line of invasion, via the Kennebec and Chaudière rivers, followed by Arnold—difficult to the last degree for his small force—may be regarded as altogether impracticable for the large army that would now be required for the reduction of the strongest place on the Continent.

The route via Richmond and Arthabaska would lend a flank to the attacks of the British, and expose our communication to assault from Montreal. The only other route is the one adopted by Montgomery—the line via Montreal: and the reduction of that city must be first effected, in order to protect the flank of the army marching down the St. Lawrence. Moreover, that river is desirable for the transportation of heavy ordnance, without which the siege of Quebec would be a farce. Finally the control of the river by vessels of war or heavy floating batteries is necessary, in order that the city may be invested—otherwise the investing army would be cut in two by the stream. We are, then, at first, neither in a position to reach nor to reduce Quebec.

The capture of Montreal is a necessary stepping-stone to the reduction of Quebec. But there are many other reasons why we should choose Montreal as our primary objective. We have already seen that the Canadian canals give entrance to British war-vessels into the Great Lakes. The capture of Montreal would cut Canada in two; it would give us possession of the Beauharnois and Lachine canals, and protect the country above from naval attacks by any vessels except such as might have ascended the St. Lawrence before the surrender of the city; and

the ultimate capture of such vessels would be certain. Moreover, it would place us in possession of the metropolis and chief railroad centre of the Dominion, thus causing such embarrassment to the trade of the Canadians as to bring them to a realizing sense of the inconvenience, if not the horrors of war. Finally, it would place us in the best possible position for operating in any direction that military circumstances might require.

The operations against Montreal would be of such importance as to demand the efforts of a great army. This army should have its primary base at Albany, a point easily reached by rail or water from all parts of the country. A secondary base would be at Rouse's Point. The enemy would probably be first met at Fort Isle-aux-Noix near the frontier; and would almost certainly be encountered in force at St. John's, as that place is a strategic point of importance, commanding the junction of several railroads, the Richelieu Canal, and the Vermont Central R. R. bridge over the Richelieu River. If dilatory mobilization and concentration on our part should give time to the British, we should probably find them strongly intrenched at St. John's; at any rate, in this vicinity would be fought the battle for the control of the Richelieu Canal and the possession of the Montreal angle formed by the St. Lawrence and the Richelieu. Victory here would enable us to hold the waterways as far down as Sorel, would cause the retreat of the British to the Island of Montreal, and would give us possession of the Beauharnois Canal. Proximity to its base, and the fact that its front would cover its line of retreat, would save our army from heavy disaster in case of defeat.

Arrived opposite Montreal, the American commander would find himself confronted by a serious problem. The river here is navigable for the largest vessels of the British navy, and is a mile and a quarter wide. Just above the city the stream narrows to half a mile, but the water rushes through the narrow channel at the rate of eighteen miles an hour. It goes without saying, that the Victoria bridge would be rendered impassable at the first approach of the Americans. A passage of the St. Lawrence at Montreal by a large army while the river was open, opposed as it would be by a formidable force on land, aided by naval vessels in the river or by the active alliance of nature in the foaming rapids, would require military genius of the highest order, and would be an achievement worthy of ranking with Napoleon's passage of the Danube at the Island of Lobau. But even if our army were

baffled for months in attempting the passage, the approach of winter would change matters for the better; and an ice-locked river would place the island and city at the mercy of the Americans as surely as the Dutch ships frozen in the Helder were at the mercy of Pichegru's hussars. An advantage of immense importance that would, in the meantime, be derived from the mere presence of our army before Montreal, would be the holding in check of all naval and military reinforcements for Ontario; for, as the fall of the city would cut off the retreat of such reinforcements, the British would hesitate to place them in jeopardy by sending them beyond the menaced city.

It seems clear, then, that Montreal should be our first objective, and that we should here assume the initiative promptly and with as large and efficient an army as possible. This army, from the nature of the theatre, should be composed of a large proportion of infantry, with field artillery not exceeding three guns to each thousand men of other arms, and with only enough cavalry for screening and reconnoitring duty. The army should not be encumbered with heavy artillery; for its movements should be made with the utmost celerity, and, once before Montreal, its siege trains could be speedily forwarded by rail and water from Albany. A large force should be detached to seize and occupy Richmond, thus holding an important railroad junction, protecting the right wing of the army before Montreal from attack from Quebec, covering Vermont from invasion, and maintaining communication between the army at Montreal and one in Maine which we will consider later.

An army operating from Albany as its primary base, with a secondary base at Watertown, should move against Prescott and the Williamsburg canals. A successful passage of the St. Lawrence and the capture of the canals would snap the water communications of the British at an important point; and if the passage were absolutely secured, the army would be in a position to operate against Kingston, or to move down the left bank of the river against Montreal. In the latter case, however, the British would have the advantage of interior lines, and the movement against Montreal should not be undertaken unless the army, after masking Kingston with a strong detachment, could still be superior to any force which it might encounter. Otherwise the movement would be an imitation, on the same theatre, of the dismal strategy of Amherst in 1760, and Wilkinson in 1813—the

former undeservedly successful and the latter deservedly unsuccessful. If the activity of the British military and naval forces on the St. Lawrence should protect Prescott and the canals by barring the river, this army could, at least, defend New York from incursions of the enemy, protect the left flank of the army operating against Montreal, and in case of need be drawn in to the assistance of that force. It would probably be the part of wisdom to limit the strength of the army in question to the numbers sufficient to insure the destruction of the canals and the defense of the New York frontier.

Hamilton would be an objective of great importance ; mainly as furnishing a base for further operations. In the case of Montreal, to designate the object is to name the theatre ; but with Hamilton such is not the case. Ontario can be invaded from the west as well as from the east ; and an army based on Detroit and Port Huron would have as secure a starting point as one invading from Buffalo and Niagara. But the operations would not be so decisive. If in the former case we were in complete naval control of Lake Erie, the theatre would give us the advantage of a reëntering base ; but otherwise the enemy, if beaten back, would continually cover his line of retreat, would abandon only such territory as was actually wrested from him, and would draw nearer to his reinforcements with each step in retreat. On the other hand, an army invading from the Niagara frontier would at once break the general line of the enemy and a successful battle would probably mean the reduction of the province. A glance at the map shows that if we were to undertake simultaneous movements from Buffalo and Detroit, the Canadians would have the advantage of interior lines with excellent communications. Instead of invading by double lines, we should, then, throw our greatest weight on the side of Buffalo ; but the Detroit line should not (as we shall see) be altogether neglected ; and under certain circumstances it might even become the most important line of all.

A large garrison of regular troops should be continually kept at Forts Porter and Niagara ; and at the first sound of war they should be thrown across the frontier, seizing and holding the International R. R. bridge between Fort Erie and Buffalo, and the Roebling, Keefer and Cantilever bridges below the falls of Niagara. Pushing on with the utmost celerity, they could then seize the Welland Canal and blow up its locks. If unable to maintain its position on the canal, this force could then fall back and

occupy bridge-heads at the bridges mentioned until the main army should begin its passage. Unless the Ottawa and Georgian Bay Canal were completed and in successful operation, the destruction of the Welland Canal would insure the safety of the upper lakes. Lieutenant Schenck in his valuable essay on "Our Northern Frontier," states that within 100 miles by rail of the Welland Canal, the Canadians have 9000 militia with 42 guns, completely armed and equipped; but he fails to note that the mobilization of this force would require some appreciable time. Recognizing the value of the initiative, the slowness, at best, of militia assembling, and the superiority of regular troops, it seems probable that a force of two regiments of regular infantry with a squadron of cavalry and two or three batteries of light artillery would, if acting promptly and with celerity, be amply sufficient for the destruction of the canal.

A victory in the Niagara peninsula would almost certainly put us in possession of Hamilton. If defeated we could fall back, covering our line of retreat, to our base. The enemy if defeated would doubtless retreat either to Toronto or London. In the former case he would sacrifice all the territory lying between the lakes; and (unless we have read the history of militia wrongly) he would lose by desertion masses of men from that region. In the latter case, he would give up his communications with the forces farther east; and a second defeat would, probably, cause the capture or dispersion of his army. In either case, then, the entire railway system between Detroit and Toronto would fall into our hands; we should have a base at Detroit as well as at Buffalo; new levies or other inferior troops could cross at Detroit and Port Huron to occupy the conquered country and guard the communications; and the victorious army, easily supplied and reinforced, could then safely attack in succession Toronto, Trenton and Kingston, even though the enemy were in naval control of Lake Ontario. The capture of these important points would doubtless be a costly matter in men, material, and above all, in time. If, however, the canals near Prescott had been destroyed in the meantime, the defense of these places would be greatly crippled so far as naval assistance is concerned; and in any event they might be masked while the army pushed on to the capture of Ottawa and the reinforcement of our first army at Montreal or Quebec. The army operating from Buffalo should be composed of the regular proportion of the three arms.

The relations between Russia and England might necessitate the retention in India of a great British military force. But national friendship and enmities are essentially fickle; and arrangements with Russia might enable England to send a formidable Anglo-Indian army against us. At any rate, unless Great Britain were actually at war with the Czar, we should be obliged to provide against a reinforcement of the Canadian armies by troops from India. A small army composed of volunteers raised in Minnesota and the Dakotas should be assembled at St. Vincent and sent against Winnipeg, which place should be captured and strongly held, the railroads to the east and south being carefully guarded, and the railway west of the city being utterly wrecked for miles. Raiding parties should be sent from various parts of the frontier of Montana, with instructions to blow up bridges and viaducts, and tear up the road to the utmost degree in their power. An attempt should be made to destroy the Canadian Pacific in British Columbia, but further than sending a small force for this purpose, the operations of our armies on the Pacific Coast would, as we have already seen, be necessarily limited to the defensive.

Thus far we have considered things in a rather favorable aspect for the Americans. Let us suppose, however, that the war, while of the nature of a surprise to us, has been premeditated by Great Britain. Her 146 war-vessels suitable for service on the lakes, while probably not all available for duty in American waters, permit her to assemble a large fleet on the St. Lawrence; a force is posted on the Niagara River, covering the Welland Canal, and strongly intrenched; the St. Lawrence canals are strongly guarded, and a large army in an intrenched camp at St. John's bars the way to Montreal; in other words, it is impossible for us to cross the St. Lawrence or the Niagara, and the British navy has free access to Lakes Ontario and Erie. The Detroit route now becomes of paramount importance. Vessels taken from our merchant marine on the lakes, regardless of cost, are sunk in the channel of the Detroit River, and the passage of the British fleet is further barred by submarine mines. If the Ottawa and Georgian Bay canals be completed, similar obstructions are placed in St. Clair River. We thus secure a passage into Canada, which passage will be greatly facilitated by the completion of the tunnel of the Detroit River. Our worst strategic line now becomes our only one. We must beat the enemy back upon his

natural line of retreat, and drive him upon his reinforcements. The war will be long, bloody, costly, and bungling—in fact it will be just such a war as we have carried on more than once in the past. Our military force must be enormous, because we shall have long lines of communication, and they will be everywhere exposed to combined naval and military expeditions—"naval raids" if I may be allowed to coin that term. Still, by sheer dint of superior numbers and resources, we should probably be able to reach Ottawa, open new communications via the Canadian Pacific to Sault Ste. Marie and Winnipeg, and push on to Montreal in spite of the British gunboats controlling the lakes. It would be a case in which "the longest way round would be our shortest way there"—because it would be our only way. Even in this case, unless such places as Kingston were masked by very large detachments, their reduction might occupy as much time as the capture of St. John's and Montreal by the first army considered. Our lack of preparation and our want of naval force would place us at a heavy disadvantage.

We will suppose, however, that the canals have been seized as already indicated, and operations carried on as already described. Thus far, it may, I think, be safely claimed that the military geography of Canada has favored the Americans quite as much as it has their adversaries. But in the eastern theatre the geographical balance, so to speak, is heavily against us. After the capture of Montreal our next steps are by no means easy. If the St. Lawrence were controlled by our navy, it would be an easy matter to transport the heaviest kind of ordnance by water from the arsenal at Troy to the trenches before Quebec; but otherwise we should be under a very serious disadvantage; for there is a limit to the size of guns that can be carried by rail, while there is no limit to the size of those that can be carried by water. Besides the advantages of its situation and fortifications, Quebec would, therefore, have the advantage of heavier ordnance than we could possibly bring against it.* Its capture by regular approaches

* I am indebted to Captain C. W. Whipple of the Ordnance Corps, for valuable information in regard to the transportation of heavy ordnance by rail, which necessitates some modification of my statement in regard to the disadvantages under which we should labor in opposing heavy guns transported by water with such ordnance as we might be able to transport by land. In assuming that we should be under a disadvantage in this case, I based my conclusion upon the following facts: In the War of Secession, water communication enabled General Gilmore to bring against Fort Pulaski, and afterwards against the defenses of Charleston, guns of greater weight and power

would be impossible; and its reduction by blockade would be a matter of the most serious difficulty. For the latter purpose, the complete investment of the city would be requisite; and this would be quite impossible with the St. Lawrence cutting our lines in two and bearing a British fleet upon its bosom. Winter, it is true, would close the river; but during the open season all the resources in men, munitions, and supplies that the British Empire could afford would have access to the beleaguered city. It would only be when the Americans, succeeding in building a formidable fleet of war-vessels or floating batteries, should send them down the St. Lawrence beyond Quebec, or by heavy batteries on the shore combined with some system of booms and submarine mines, should succeed in permanently barring the passage of the British fleet to the city, that the place would succumb to the slow process of starvation. In any event, whether resulting in success or disaster to us, the siege of Quebec would be one of the most memorable in the annals of war.

With the British navy controlling the St. Lawrence, the American advance from Montreal would be a matter of extreme difficulty. If our army were to move entirely by the left bank of the river, a small force of the enemy could hold Quebec, while with the assistance of the navy a large part of the British army

than had ever before been used in siege operations; and under similar circumstances there would now be no difficulty in placing in the batteries any of the great guns that can be carried by a man-of-war. On the other hand, in the Franco-German war, the Prussians, limited to railway transport, could not place in their siege batteries guns of heavier power than 60-pounders, and one of the apparently cogent objections urged against the selection of Pittsburg as a site for our National Foundry was that the guns would have to be transported thence by rail (as the only alternative to an excessive length of water transportation), and that the weight and length of modern high-power guns would be too much for the bridges and curves of the railroads.

Captain Whipple informs me, however, that guns of upwards of fifty tons weight have recently been carried successfully by rail; the curves of the road being overcome by carrying the gun on two cars, the piece being so pivoted on one as to have a lateral swing on the other. The heaviest rifled mortars, weighing but little more than fifteen tons, could, of course, be easily transported by rail; and in view of what has been done in the past, it seems probable that American engineering skill would enable us to bring against Quebec or Halifax the most powerful guns that could be made. As to the capacity of the guns that we could make, there would, in my opinion, be scarcely any limit, if our Ordnance Corps received encouragement and support proportionate in some degree to the unjust censure for which it is always made a target by unsuccessful inventors and ignorant or malicious critics.

I am glad to be convinced, by such good authority, that in the cases supposed we should be more nearly equal to our opponents than I had imagined.

could advance via Richmond against our communications, secure in its own retreat so long as the fleet patrolled the river. If our advance were made entirely along the right bank of the river, the investment of Quebec on the north bank would be practicably impossible. If Montreal were captured in the winter (as it probably would be) the march upon Quebec would be very much simplified, as the river when frozen would cease to exist as an obstacle parallel to the path of our army. Otherwise it would be necessary to advance from Montreal on the left bank and from Richmond on the right; thus moving by independent lines against an enemy able to concentrate upon either. A military superiority such as to render the American force on each line able to cope successfully with the entire force guarding Quebec would, therefore, be necessary. The communications of the army operating from Richmond would probably be via the Vermont Valley R.R., and its base of supplies might be shifted from Albany to Springfield or Bellows Falls. This force would also serve to maintain communication between the army from Montreal and another important army which it is now time to consider.

The theatres thus far considered do not lend themselves readily to offensive returns by the British; but on our extreme eastern frontier we are peculiarly open to invasion. A British army based upon the St. John River from Fredericton to St. John could invade the State of Maine with a degree of impunity not pleasant for us to contemplate. Having the active support of a fleet superior to anything that we could oppose to it, this army could advance westward, establishing a secondary base at St. Andrew, and moving upon Bangor. The complete naval control of the coast would give the enemy many of the advantages of a reëntering base; for it would enable him to make combined naval and land operations against our communications, with much injury to us and but little danger to himself. The capture of Bangor would be greatly facilitated by the fleet; and the British army could advance as far west as Portland without uncovering its communications by its front, its left flank protected by the sea, and its right covered by a region impracticable for the operations of a large force. The extent to which the communications of an American army operating in Maine would be endangered is shown by the fact that all the railroads by which the army could be supplied lie within about thirty miles of the coast, and thus within easy reach of the enemy's incursions. On the

other hand, the British communications would, as we have seen, be safe from serious menace, and even a heavy defeat would not mean ruin.

The object of a British invasion of Maine would be to deflect the American efforts from unfavorable theatres to those favorable to the British. A successful invasion of the State, especially if accompanied by an ostentatious proclamation of its annexation to the British Dominions, would so rouse popular indignation in our country that the demand for the recovery of Maine would be even more potent in influencing the conduct of the war than was the cry "on to Richmond" thirty years ago; and other operations might be forgotten in a desire to drive the insolent invader from our own soil. An invasion of Maine might be conducted, then, as a diversion in favor of the British armies in Quebec or Ontario, or it might be made from the first the supreme military effort of Great Britain.

The military geography of the State of Maine is altogether in favor of an invader. The Penobscot, Kennebec and Androscoggin rivers would, it is true, be obstacles lying directly across his path; but we know that such obstacles have no further strategic value than causing delay to the invader—a delay which would in each case be minimized by the coöperation of his navy.

If England were able, as she might be, to seize the initiative promptly and to send a powerful naval and military expedition from Halifax or St. John, N. B., against Portland, the capture of that city would give her all the advantages that could be gained by marching across the State to that point. The place would be at once fortified by the captors, and its supply would be assured from the sea. It would furnish a convenient base for minor operations against various points of the New England coast, which would serve to annoy us and to distract our military plans. Moreover, to any one familiar with the Art of War, it is evident at a glance that the occupation of Portland by the British would protect the eastern provinces from invasion; for they would have the communications of the invading army by the throat. It would be necessary to recapture Portland, or to mask it with an efficient force, at least equal in strength to the army holding it, before an American army could advance against New Brunswick.

If the British in Portland found their position effectually

masked, and discovered that the American army was pushing on towards New Brunswick, their fleet could quickly transfer them back to the St. John River. If the Americans assembled in great force for the siege or assault of Portland, the withdrawal of the British could be effected in the same way, as easily as Moore's army withdrew from Corunna. If, instead of seizing Portland by a combined military and naval expedition, the British were invading Maine by marching across the State, their army could, in the face of superior numbers, fall back to the same base; and the army thus based on the St. John would be in a position to reinforce, or receive reinforcements from, the army at Quebec or Montreal so long as the New Brunswick and Intercolonial railways remained intact.

It seems clear, then, that at the outbreak of war a large and effective army should be assembled by us, at the earliest possible moment, on the eastern frontier of Maine. Boston, Salem, Newburyport, Portsmouth, Portland, Bath, Belfast and Bangor, should be strongly defended as a measure of protection to this army, which should have its primary base on the Merrimac River, with successive bases at Lewiston, Augusta and Bangor. Raids should be early and persistently made against the New Brunswick and Intercolonial railroads, which should be damaged as completely as possible, and kept continually broken, so as to destroy the lateral communications of the British armies. The nearness of these roads to the Maine frontier renders them peculiarly open to the attacks of raiding forces; but, on the other hand, the nature of the country makes the operation unusually difficult for cavalry—the only force with which raiding is possible. It may be confidently asserted, however, that cavalry which can operate in Arizona and Colorado would be able to surmount the natural difficulties of Maine and New Brunswick.

The geographical difficulties of our army, instead of diminishing, would increase with the commencement of the invasion of New Brunswick. The St. John River forms for the enemy a rectangular reëntering base, controlled as far as Fredericton by his navy, and forming a serious obstacle above that point. An attempt by our army to cross the eastern side of this angle would be opposed in front by the fleet, and would lend an exposed flank and communications to British attacks from the other side. An attack upon the northern face of the angle could be met by a retarding force, while a heavy attack from the east could be made

against our flank. A passage in the vicinity of Woodstock would compel a separation of our army under penalty of a complete exposure of our communications. In addition to these difficulties, the protection of our communications would require the detachment of a force for the capture or masking of St. Andrew. It is fortunate for us that we could assemble finally in this theatre an army much larger than the British ; for the numerical superiority would be urgently needed.

Nor would the difficulties of the situation be ended by a successful passage of the St. John. The Maine Central R. R. would constitute a line of supply via Bangor, McAdam, and Woodstock to Fredericton ; but from Fredericton to St. John there are no railway communications on the left bank of the river, and that stream would be in the hands of the British navy. The construction of about 35 miles of railroad would be necessary in order that we might reach Chipman, from which point there is a railroad to Norton on the Intercolonial. The somewhat circuitous railway communications resulting would require strong detachments for their protection. The Keswick, Nashwaak, Salmon and Washedemoak rivers would form obstacles lying directly across the path of our army and affording the enemy facilities for delaying us with a rear guard while conducting his retreat in safety.

St. John would offer us some of the disadvantages of Quebec. Though a strong natural position, strengthened by batteries, it does not approximate in impregnability to the old Walled City of the North ; but it has the advantage of a never-freezing harbor. Until we could assemble on the St. John River a naval force superior to the British fleet, or line the stream with batteries powerful enough to drive away the enemy's vessels, the reduction of St. John would be well-nigh impossible.

It may be assumed, however, that the entire British army in New Brunswick would not shut itself up in St. John. Easily defended by permanent batteries and the navy, that place could be entrusted to a comparatively small force, with full confidence that, owing to its position on the flank of our communications, we should not dare to neglect it, but should have to mask it with a force much larger than the garrison. The main force of the British would doubtless retreat behind the Petitcodiac River, where it would find a position of remarkable strength. With a front of less than fifteen miles, the army could rest its right flank on Northumberland Sound and its left on the Petitcodiac, a great

part of its front covered by a small river, and a railroad running along the rear of the position. The flanks could not be turned, the navy could deliver a flanking fire along the lines, reinforcements could be speedily sent from one part of the line to any other, and supply from the sea and by rail from Nova Scotia would be sure and easy. I have not been able to learn the exact nature of the topography of this place; but unless it presents disadvantages not hinted at by any ordinary map, it would be a position not one whit inferior to the Lines of Torres Vedras; for while there would be no Monte Junto to divide the assailant's front, the position is scarcely more than half as long as Wellington's famous lines, the navy (from the nature of the position and the increased power of its ordnance) could lend a greater degree of assistance than it was able to give the Iron Duke, and the railroad would give advantages not dreamed of eighty years ago in Portugal. St. John would be connected with the lines by about 120 miles of waterway, by means of which, should the New Brunswick metropolis prove untenable, its garrison could be withdrawn to the lines of Petitcodiac. Should the freezing of the river deprive the line of the support of the navy, and thus expose a flank, a position of almost equal strength could be taken up thirty miles to the rear, where the army would form on about the same front as before, its left resting on Cumberland Basin, its right on Bay Verte. On the left is a high hill, occupied in colonial times by the French Fort Beauséjour, while a great portion of the front is covered by the marshes of Missaguash and Tantemar. In fact, the absence of the railway in rear of, and parallel to, the lines is the only point in which this position is inferior to the one on the Petitcodiac; while the marshes covering its front would make it much stronger as a purely defensive position.

It is not necessary to consider at length the strategic features of Nova Scotia. Without great naval strength we probably could not overcome the lines on the Nova Scotian isthmus, if Great Britain saw fit to make a strong exertion at that point, and an invasion of Nova Scotia would be out of the question. If, on the other hand, we had a navy superior to that of England in American waters, we could land a force at any point on the coast of Nova Scotia, and the defense of the province would be so difficult that it probably would not be seriously undertaken. It may, however, be well to note that if (though having a naval inferiority) we should force the lines on the Isthmus, it would be an

evidence of such enormous military superiority as to make a rapid retreat upon Halifax the only thing left to our adversaries ; but the Philip and Wallace rivers, the Cobequid mountains, and then the Salmon and Shubenacadie rivers would furnish fine obstacles for the use of the British rear-guard ; and, if skilfully commanded their army could safely reach Halifax. We should then have a repetition of the old problem ; namely the reduction of a city strongly fortified, fully garrisoned, assisted by a powerful fleet, and open the year round to supply from the sea.

It is, I think, evident that with a suitable naval force coöperating with our armies, the conquest of Canada, if not speedy, would be at least sure. But in the absence of such naval auxiliary the situation could, perhaps, be best expressed by a Celticism : England could not hold Canada, and we could not conquer it. In other words, our military power, properly directed, would enable us to conquer Canada from the Georgian Bay to the city of Quebec, and perhaps to the Nova Scotian isthmus. But the capture of Quebec, the invasion of Nova Scotia, and the reduction of Victoria and Esquimaux would be well-nigh impossible while the British fleets were superior to our own, unless the English commanders on sea and land should display the most pitiful incapacity, and our own, the most dazzling genius. Let me not be misunderstood : I do not say that the United States could not conquer Canada. I mean that a complete conquest as the result of the operations of war alone, uninfluenced by internal troubles, foreign alliances, or financial difficulties on one side or the other, could probably be effected by us only when we had provided ourselves with a naval force superior to any armada that Great Britain could send to the American waters.

It is impossible within the limits of a single lecture, to give more than the barest epitome of this important subject. Many weighty considerations have necessarily been omitted. I do not profess to have indicated the only lines of invasion, or counter invasion, nor to have outlined all the military possibilities presented by the geography of Canada. We may be sure, however, that, whatever be the plans of campaign or the conduct of the war, the next invasion of Canada, whether successful or unsuccessful, will furnish an illustration of the truth of Von Moltke's apothegm : " Geography is three-fourths of the science of war."

[BIBLIOGRAPHICAL NOTE.—The following works have been consulted in the preparation of this lecture : *Military Aspect of Canada*, by Col. Strange ; *Canadian De-*

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ARTILLERY SERVICE IN THE WAR OF THE REBELLION.

BY BVT. BRIG.-GEN. J. C. TIDBALI, U. S. ARMY.

(Continued from JOURNAL, No. 56.)

V.

AS stated in the preceding paper, the Army of the Potomac, after the battle of Chancellorsville, returned to its former camps opposite Fredericksburg, where it rested until June 9th, when it commenced the movements incident to the memorable Gettysburg campaign. During the month included between these two campaigns, a very important change was effected, or rather inaugurated, in the organization of its artillery. All battles and campaigns up to this time had so forcibly demonstrated the defects and weaknesses of the former system as to convince all, except the most stolid, of the necessity of a change. General Hunt, still the able chief of artillery of that army, had given the subject careful study from the beginning, and had been persistent in his efforts for a reform.

Every defect of the former system was made manifest during the Chancellorsville campaign, and Hooker, still commanding the Army of the Potomac, and now willing to listen to the suggestions and advice of his artillery chief, consented that the artillery should be formed into brigades of batteries, one for each army corps, two for the cavalry and four for the Artillery Reserve; each to be under its own distinct commander, who received his orders direct from his corps commander. This was a long stride in advance; but for reasons heretofore stated there were, at first, but few officers on duty with the army who were of suitable rank to command these brigades. General Hunt, in his report of the battle of Gettysburg, animadverting upon this defect, says: "In my report of the battle of Chancellorsville, I took occasion to call attention to the great evils arising from want of field officers for the artillery. The operations of this campaign, and especially the battle of Gettysburg, offered further proof, if such were necessary, of the mistaken policy of depriving so important an arm of the officers necessary for managing it. In this campaign, for the

command of 67 batteries (372 guns), with over 8000 men and 7000 horses, and all the material and large ammunition trains, I had one general officer commanding the Reserve, and but four field officers,—two colonels, one lieutenant-colonel, and one major. In the seven corps, the artillery of two were commanded by colonels, of one by a major, of three by captains, and one by a lieutenant, taken from their batteries for the purpose. The two brigades of horse artillery attached to the cavalry were commanded by captains, and there was one field officer in the Reserve. The most of these commands in any other army would have been considered proper ones for a general officer. In no army, would the command of the artillery of a corps be considered of less importance, to say the least, than that of a brigade of infantry. In none of our corps ought the artillery commander to have been of less rank than a colonel, and in all there should have been a proper proportion of field officers, with the necessary staffs. * * * Not only does the service suffer, necessarily, from the great deficiency of officers of rank, but a policy which closes the doors of promotion to battery officers, and places them and the arm itself under a ban, and degrades them in comparison with other arms of service, induces discontent, and has caused many of our best officers to seek positions, wherever they can find them, which will remove them from this branch of the service."

Gettysburg was the first battle of the Army of the Potomac in which the artillery as a whole was brought to the front, a fact due to the more efficient organization which it had just received. If the same thing had occurred at some of the other battles it is more than probable History would have had a different story to record. One of the main features of this battle was the grouping of batteries, thus giving to their fire the effect of concentration and mass. The history of this battle, like that of other battles, has been compiled chiefly from the reports of corps, division, and brigade commanders which, as a matter of course, do not enter into the reasons why the artillery was more efficient upon this than other occasions. It is a question so purely professional as not to belong to the popular or more ordinary accounts of the battle, and therefore the valuable lessons so forcibly demonstrated by this, the most momentous battle of the war, have been almost entirely overlooked. Gettysburg has been thoroughly discussed from every point of view except that of the artillery; yet every account of the battle refers to the effectiveness of this arm.

Scarcely any one of them omits to mention the distinguished part which it performed ; but how this was brought about, and wherein the management of batteries in this battle differed from that at Chancellorsville or other preceding battles, has been passed by as a mere tactical or administrative question quite overshadowed by the magnitude of the conflict as a whole.

The artillery of the Army of the Potomac had at last received the same efficient organization as that long in use in Lee's army, and at this battle the whole of the artillery of both armies was fought up to its fullest capacity, and fully demonstrated the great power and influence in battle of this arm when properly managed. The adoption of the new system in the Army of the Potomac was so recent as not to be entirely complete in its details at the time of the battle, but, notwithstanding this, the advantages flowing from it were so numerous as to convince all of its utility except the few still wedded to old ideas.

With the exception of the artillery there was no other important change in the organization of the Army of the Potomac. The corps were identically the same as in the Chancellorsville campaign and were under the same commanders ; with the exception of the Second, now commanded by Hancock, vice Couch, transferred to another field of duty ; and the Fifth, now commanded by Sykes, vice Meade, now commanding the army. Stoneman had been relieved from the command of the cavalry by Pleasanton. This arm had received some increase by the incorporation of Stahl's Division from the Valley of the Shenandoah, and with it a volunteer battery of horse artillery, making in all ten batteries of this arm.

Immediately after Chancellorsville, Lee organized his army into three instead of two corps, thus giving to his command the natural function of a *right*, *left* and *centre*. Ewell had been assigned to the command of Jackson's Corps ; Longstreet remained in command of his former corps, while A. P. Hill was assigned to the new corps, composed partly from the two original corps, together with some new troops. Stuart continued in command of his cavalry, which had been considerably increased since Chancellorsville.

On June 7, 1863, Lee began the campaign for the invasion of Pennsylvania, following, in a general way, the same route pursued by him in the Antietam campaign of the previous summer.

Leaving A. P. Hill to maintain with his corps a show of oc-

cupancy, and thus retain Hooker as long as possible in his position on the opposite side of the Rappahannock, he quietly withdrew the corps of Longstreet and Ewell and started them, via Culpepper, on their way to the Shenandoah Valley, down which was to be his route, and thence across the Potomac into Maryland, and on into Pennsylvania, with Harrisburg, and perhaps Philadelphia, as his ultimate objective. Many reasons impelled him to make this invasion, chief among which was the influence that the occupancy, though but temporary, of so much Northern territory would have upon the foreign nations which the Confederacy was so very desirous of having recognize its belligerent rights.

As soon as Hooker discovered the nature of Lee's movements he withdrew his army from its camps in front of Fredericksburg, and started it (June 13) for the Potomac, keeping between Lee and Washington City. Lee marched his corps up the right bank of the Rappahannock, thence through passes in the Blue Ridge into the Shenandoah Valley. Using the mountains to screen his movements, he pushed down the valley and crossed the Potomac at fords above Harper's Ferry. This advance crossed the river on the 14th, and reached Chambersburg on the following day. Stuart, with his cavalry and horse batteries, covered the right flank of Lee's army as it marched up the Rappahannock, and then guarded the passes of the mountains as it proceeded down the valley.

Hooker, following up Lee's movements, with the mountains intervening, covered his left flank with his cavalry and horse batteries. These two opposing cavalry forces were in constant collision, resulting in many skirmishes and combats, some of which, as those of Beverly Ford, Aldie and Upperville, approximated the dignity of battles—in fact were cavalry battles—in all of which the horse batteries performed as usual important services.

Stuart had been directed by Lee to hold the mountain passes with part of his force as long as any of the Federal army remained on the south side of the Potomac, and with the remainder to cross into Maryland and place himself on the right flank of the Confederate army to guard it as it proceeded into Pennsylvania. Stuart, however, adopting a different plan, started on a raid around the Federal army, passing between it and Washington, intending to join the main army in the vicinity of Harrisburg, which

he knew to be Lee's objective. In pursuance of this scheme he crossed the Potomac near Drainsville on the 27th, and bearing off towards Washington caused great consternation at the Capitol. Near Rockville he captured a large train of wagons loaded with supplies for Hooker's army. Retaining about one hundred of these wagons he destroyed the rest, but secured the horses and mules. After doing considerable damage to the canal and railroads, and temporarily interrupting communication with Hooker's army, he struck northward toward York, Pennsylvania, where he expected to find part of Ewell's Corps. On his way he was, however, intercepted by Kilpatrick's cavalry, with which he had a series of skirmishes. His long train of captured wagons was a great incumbrance to him. Arriving at York, he found that Ewell's troops had left for Carlisle, whither he followed them. Here he ascertained that Lee was concentrating at Gettysburg, to which point he now hastened his march; but arrived there too late for the battle of the first day, but in time to have, on the following day, a sharp skirmish with Gregg's cavalry division near Hunterstown. Here he was joined by a fresh brigade, and on the following day had, near the same place, a heavy engagement with Gregg's force. In all of these engagements the horse batteries took an active part and came in for a full share of the fighting.

Stuart's absence from Lee proved a very great embarrassment to the latter, leaving him without means of discovering the movements and intentions of his adversary. Ewell's Corps had proceeded to York and Carlisle, with detachments as far north as to the Susquehanna River, threatening Harrisburg. Hill and Longstreet were moving their corps northward, still on the western side of the Blue Mountain, near the Fairfield and Cashtown passes, west of Gettysburg. On the night of the 28th Lee obtained information through his scouts that the Federal army had crossed the Potomac and was now in the vicinity of Frederick, Md., moving towards South Mountain and threatening his long line of communication. This caused him to abandon his movement on Harrisburg and to direct his corps to concentrate on Cashtown, a central point between Chambersburg and Gettysburg, distant from the latter place about twelve miles.

Longstreet and Hill crossed the Potomac near Williamsport on the 24th. Hooker being now satisfied of the intentions of the enemy, crossed on pontoon bridges at Edward's Ferry on the 25th. Sending the Twelfth Corps to reinforce the position at

Harper's Ferry, deemed by the military authorities in the War Department of primary importance, he concentrated his other corps at or near Frederick. It was this concentration that caused Lee to abandon the project of carrying his campaign beyond the Susquehanna.

At this critical moment, June 28th, Hooker was relieved from the command of the Army of the Potomac, and Meade, then commanding the Fifth Corps, was appointed in his place. Hooker and Halleck,—then general-in-chief and military advisor at Washington,—had differed upon many points regarding the management of the campaign, notably upon that of retaining a large force guarding Harper's Ferry, which Hooker,—as did McClellan under similar circumstances in the Antietam campaign of the preceding year,—regarded as an unwise absorption of troops, and a weakening of the active force with which he was expected to meet and defeat the enemy.

This assignment to the command of the army was entirely unexpected to Meade, and as a battle was then imminent, the shortness of time allowed him no opportunity for maturing plans of his own for the movement of his troops; he therefore continued, without material change, the programme of marches for the various corps designated by his predecessor. It may, however, be mentioned, that one of his first acts was to withdraw the troops from Harper's Ferry, thus making available some 10,000 men for active work in the field; without which Lee would have had superiority in numbers, leaving to conjecture what might have been the result of the battle of Gettysburg under such conditions. The battle took place before Meade's action could be interfered with.

From Frederick, Meade started his various corps northward in the direction of Harrisburg, towards which he now knew the enemy was making his way. In the meanwhile, Hill had reached Cashtown, from which place Pettigrew's Brigade of Heth's Division was sent forward, on the 30th, to Gettysburg, to secure such supplies as the country stores of that place could furnish his needy soldiers; but before reaching the place, Pettigrew encountered the Federal cavalry and halted. On the following morning Hill, joining him with Pender's Division and two battalions of batteries, moved forward to ascertain the strength of the enemy, whose force was then supposed to consist chiefly of cavalry. Hill encountered Buford's vedettes about three miles west of Gettysburg, and continued to advance until within about two miles of the town when

his leading brigade came upon the enemy in considerable force. This was Buford's division of cavalry, the battery with which,—A, 2d U. S. Artillery, under command of Lieutenant Calef,—had the honor of firing the opening gun of this sanguinary and momentous battle.

Buford having reported to Meade that the enemy was in force on the Cashtown road, near Gettysburg, the latter ordered Reynolds, then (June 30th) at Emmitsburg, ten miles south of Gettysburg, to proceed with his own First Corps and Howard's Eleventh Corps, also near the same place, to the assistance of Buford. Upon reaching Gettysburg on the forenoon of the following day, July 1st, Reynolds found Buford's cavalry and Calef's battery hotly engaged with Hill's troops which they were holding in check in the most gallant manner. Reynolds deployed his leading division, and attacked without delay, at the same time sending orders to Howard to advance his corps as promptly as possible. Soon after making his dispositions for attack, Reynolds fell, mortally wounded, and the command of his corps devolved upon Doubleday, the senior division commander, while Howard succeeded to the command of the whole. The latter had arrived about this time, 11.30 A. M., with the Eleventh Corps, which, for the time being, fell to the command of Schurz.

Howard pushed forward two divisions of the Eleventh to the support of the First, now hotly engaged with Hill's Corps on the ridge to the westward of the town. The remaining division of the Eleventh took position on Cemetery Hill, adjoining the town to the southward. Here Howard established his headquarters. The two divisions of the Eleventh moved through the town with a view to strengthening the right of the First, but soon after emerging from the town they encountered Ewell's Corps then arriving from the direction of Carlisle. The arrival of Ewell gave the enemy such a preponderance in numbers as to cause both the First and Eleventh to yield to the pressure and fall back through the town to Cemetery Hill, where they took position about 4 P. M.

Upon learning of the death of Reynolds, Meade, whose headquarters were at this time at Taneytown, some eight miles distant, dispatched Hancock to the field to assume the management of affairs. In conjunction with Howard, Hancock proceeded to post the troops on Cemetery Ridge and to repel an attack made by the enemy on the right flank of that position. This attack

being repulsed, the enemy rested satisfied with the ground he had gained earlier in the day, and made no further attack that afternoon.

These, in general, were the operations of the battle of the first day, in which Lee had about one-half of his army engaged against two-sevenths of that of Meade. His facilities for concentrating at that point were superior to those of his opponent.

About 7 P. M. Slocum with the Twelfth, and Sickles with part of the Third Corps, arrived and took position on the left of that occupied by the First and Eleventh. Meade being informed that it was evident Lee was concentrating his whole force at Gettysburg for the purpose of offering battle, ordered up his three remaining corps, and sent back to Westminster, about twenty miles distant, all unnecessary impedimenta, in which, strange to say, was included two batteries of long range siege rifles; guns which would have found most useful employment had they been present on that field.

As soon as he had made these dispositions, Meade, himself, hastened forward and arrived on the field early in the morning of the 2d.

The two armies now about to meet, to continue as a whole the battle of the first day, consisted of the following corps, divisions, brigades and batteries, actually present on the field:

FEDERAL ARMY.

	Div.	Brig.	Reg.	Batteries.
First Corps.....	3	7	33	5
Second ".....	3	10	44	5
Third ".....	2	6	37	5
Fifth ".....	3	8	32	5
Sixth ".....	3	8	36	8
Eleventh ".....	3	6	26	5
Twelfth ".....	2	6	28	4
Cavalry ".....	3	8	35	9
Artillery Reserve.....	..	..	..	17
	22	59	271	63 = 356 guns.

CONFEDERATE ARMY.

	Div.	Brig.	Reg.	Batteries.
Longstreet's Corps....	3	11	52	22
Ewell's ".....	3	12	61	20
Hill's ".....	3	13	57	20
Cavalry ".....	1	7	30	7
	10	43	200	69 about 300 guns.

The field returns of the Army of the Potomac for June 30th

give the strength of that army, present, equipped for duty, as 5286 officers and 71,922 enlisted men of infantry. The artillery and cavalry, together, aggregated about 16,600, making a grand total of 88,522. Taking the regiments of the two armies as a common unit would make the strength of the Confederates a fraction over 65,000. But as the Confederate conscription was now in full operation, and being inexorably enforced, filling up the regiments in the field, it is more than probable that Lee's regiments were much stronger than those of Meade, thus largely reducing the apparent disparity of numbers.

It will be observed from the foregoing table that the divisions in Lee's army were almost equal in strength to corps in Meade's army. To each of his nine divisions of infantry was attached a battalion of batteries—a battalion being synonymous with brigade in the Federal army. The battalions of Lee's artillery reserve were, for this campaign, distributed to the three infantry corps—two battalions to each corps. The cavalry had one battalion of seven batteries. Remembering that divisions in Lee's army were but little less than corps in that of his opponent, it will be perceived that the artillery organization and assignments in the two armies were quite similar.

Gettysburg, as the world now knows, was at that time, 1863, a country town of some four thousand inhabitants, and a centre from which radiated in every direction a number of roads. It is rather remarkable in this respect, and it was owing to this fact that it became the field upon which was decided, more than upon any other of the war, the integrity of the Union. The Confederates, approaching from the north and west, concentrated upon it by the Carlisle and Cashtown roads; while the Federals concentrated by the Emmitsburg and Taneytown roads converging from the southward and eastward.

Lee, as previously mentioned, was pushing his way towards Harrisburg, when he got information that his adversary had crossed the Potomac and was threatening his communications from the direction of Frederick. He then turned about to give battle, and this naturally brought his troops more promptly together than those of Meade, which were necessarily somewhat spread out to guard against any turn that Lee might make in the direction of Baltimore or Washington; and it was for this reason that he had more troops present on the first day of the battle than Meade had.

The town of Gettysburg is picturesquely situated about twelve miles from the Blue Ridge, in this part called the South Mountain. From the mountain eastward is a series of parallel undulations or ridges, the most important one of which, so far as the battle was concerned, is Cemetery Ridge, extending between Cemetery Hill on the outskirts of the town on its southern side, to a small mountain or butte called Little Round Top, standing about two miles south of Cemetery Hill. Beyond Little Round Top is another and larger butte called Round Top, separated from the former by a narrow, rocky and wooded valley. These two buttes are in fact one mountain with a narrow pass between, and both are but rugged piles of stones covered with trees and a thick entanglement of underbrush. Little Round Top, as the *point d'appui* of the Federal left, was a position of great military importance; and in the rocky gorges in front of it took place, for its possession, some of the most desperate fighting of the battle.

Cemetery Hill was, however, the key-point of the situation. Overlooking, as it does, all the country round within battle range, it had a decisive influence upon the progress and final result of the contest. Its southern and western faces are gentle slopes, while towards the north it looks over the town and fields beyond, to ranges of hills, then in possession of the enemy but too distant for the effective use of artillery. The two miles of fields between Cemetery Hill and Little Round Top is more an undulating plateau than a ridge, and is, as it were, a curtain connecting the eminences at its extremities as bastions. It was this curtain that received and resisted the heaviest attacks of Lee, made by the corps of Longstreet and Hill, on the 2d and 3d.

From the eastern side of Cemetery Hill, a spur, known as Culp's Hill, extends around for about half a mile when it terminates precipitously at Rock Creek, a fordable stream running in a southeasterly direction and to the rear of Little Round Top, but at some distance from it. Culp's Hill was the scene of the determined assaults made by Ewell's Corps for the purposes of breaking and turning the Federal right. This hill extends beyond the narrow, marshy valley of Rock Creek under the name of Wolf's Hill, a rocky and wooded ridge which played no further part in the events of the battle than as an obstruction to the enemy in his attempts at turning the right flank.

The first day's battle took place chiefly on Seminary Ridge, which lies about a mile to the westward of Cemetery Ridge and

runs approximately parallel to it. The buildings of a Lutheran Theological Seminary, from which the ridge takes its name, are located on it due west of the town. The main building has a commanding position, the belfry of which—the building—Lee made use of as a point of observation during the battle. On the far side of these buildings from the town is a grove of trees, in the outskirts of which Reynolds was killed in the forenoon of the first day. About a third of a mile still farther to the westward is another undulation or ridge, between which and still another ridge further on, is a small brook called Willoughby's Run. All of these ridges and their intervening valleys or depressions constitute simply an undulating country, the unevenness of which, while sufficient to screen from view the movements of troops, was insufficient to afford them much protection from the artillery fire of the opposing forces. The slopes of the ridges were so gentle as to have about the same curvature as the descending branches of the trajectories of the projectiles, making their reverse sides more dangerous, if anything, than their fronts.

With the exception of a few open clumps of trees, here and there along Cemetery Ridge, the whole of it, almost to Little Round Top, as well as the valley or depression in front to Seminary Ridge, were open fields of ripening grain. The Seminary Ridge was more wooded, especially on that part of it from near the Seminary buildings around to Little Round Top. The woods immediately in front of that mountain cover a rocky ravine known as the Devil's Den, in and about which took place some of the most desperate fighting of the contest. The woods on Seminary Ridge formed an excellent screen behind which Lee made his movements, and from which he launched his columns for the attack of the Federal position on Cemetery Ridge.

The Cashtown road coming in from the westward, crosses the Seminary Ridge and the ridge beyond at right angles. It was by this road that Hill's Corps, followed by that of Longstreet, reached the field, Ewell's Corps, approaching from the northward, arrived simultaneously by the Carlisle and York roads.

Descending from Cemetery Hill through the town, to the northward, the country is more flat and level until some low ridges are reached a mile or so beyond. Here is where the Eleventh Corps encountered Ewell's troops when about to strike the rear and right of the First Corps, on Seminary Ridge, while sorely pressed by Hill's troops in front.

Such, in general, were the topographical features of this celebrated field, a somewhat protracted mention of which is necessary for a more complete understanding of the events and operations of the battle now to follow.

It has already been stated that on June 30th, Buford held, with his cavalry, the road leading from Cashtown, and, picketing around northward to the York road, gave information that the enemy was advancing in force from both of these directions. Buford in his report says:—"By daylight on July 1st, I had gained positive information of the enemy's position and movements, and my arrangements were made for entertaining him until General Reynolds could reach the scene. Colonel Gamble formed an admirable line with his brigade, and moved off proudly to meet him. The two lines soon became hotly engaged, we having the advantage of the ground, he of numbers (which were infantry). This brigade held its own for more than two hours, when it was withdrawn to a position more secure and better sheltered. Tidball's battery, commanded by Lieutenant Calef, Second U. S. Artillery, fought on this occasion as is seldom witnessed. At one time the enemy had a concentrated fire upon this battery from twelve guns, all at short range. Calef held his own gloriously, worked his guns deliberately, with great judgment and skill, and with wonderful effect upon the enemy. The First Brigade maintained this unequal contest until the leading division of General Reynolds' Corps came up to its assistance, and then most reluctantly did it give up the front. While the left of my line was thus engaged, Devin's Brigade, on the right, had its hands full. The enemy (Ewell's Corps) advanced upon Devin by four roads, and on each was checked, and held until the leading division of the Eleventh Corps came to his relief." It was now about 10 A. M. Buford, in withdrawing, took position on the left of the First Corps, where his cavalry continued aggressively active throughout the day in preventing the enemy from extending his forces around in the direction of Little Round Top. All reports of the enemy mention his operations on this flank as being exceedingly troublesome to them.

The advance of the First Corps, consisting of two brigades of Wadsworth's Division, was immediately deployed across the Cashtown road on the next ridge west of Seminary Ridge. Hall's Maine battery was posted on the road. The enemy soon advanced in greatly superior numbers, and swept the right of this

line back to Seminary Ridge. Hall having his horses shot down was forced to abandon one of his pieces. General Reynolds, who was with that part of the line still intact, was killed while superintending the progress of the action, and anxiously awaiting the arrival of his approaching troops, some of whom soon arriving, the enemy's advance was pushed back across Willoughby's Run and the ridge temporarily regained. Calef, whose battery was loaned to Wadsworth by Buford, was ordered into position on the ground lately held by Hall's battery, and here, as described by Buford, meeting the fire of three rebel batteries, suffered greatly in men and horses. When the enemy were forced back over Willoughby's Run the Confederate general, Archer, and a goodly number of his command were taken prisoners.

About 11 A. M. the other two divisions of the First Corps—those of Doubleday and Robinson—arrived, and with them the remaining four batteries of the corps under Colonel Wainwright of the 1st N. Y. Artillery. Some of these troops, with a couple of the batteries, were pushed forward into the severe contest now raging on the ridge just mentioned, while the remainder took position on Seminary Ridge. One of the batteries sent forward,—that of Reynolds' 1st N. Y. Artillery,—joined Calef's horse battery which was now contending against heavy odds of both infantry and artillery. These two batteries held their ground until the enemy, posting batteries upon their right, secured a heavy cross-fire upon their position, forcing them to retire from the unequal contest. Captain Reynolds was wounded, and many men and horses of both batteries placed *hors de combat*. Calef then rejoined the cavalry to which he belonged.

Two divisions,—Heth's and Pender's, of Hill's Corps,—were now up and formed on the ridge beyond Willoughby's Run. Together, these divisions numbered 36 regiments, with 8 batteries of about 35 guns, against the First Corps of 29 regiments and 5 batteries of 28 guns. Notwithstanding this disparity of force in favor of the Confederates the Federals were holding their own, until the arrival of Rodes' division of Ewell's Corps upon their right flank, when they were forced to fall back through sheer superiority of numbers.

The Eleventh Corps, having started from Emmitsburg at 8 A. M., reached Gettysburg about noon, and Howard, learning that Doubleday, now commanding the First Corps, was hard pressed on his right, hastened forward Schurz's and Barlow's divisions, to

take position on Seminary Ridge on the right of the first. Each of these divisions was accompanied by a battery; the other three batteries, supported by Steinwehr's Division, were placed in position on Cemetery Hill. While these two divisions of the Eleventh were passing through the town on their way to the assistance of the First, Rodes' Division of Ewell's Corps arrived from the north by the Carlisle road, and, screened from view by a strip of woods, was deploying to attack the flank and rear of the First, still holding on to Seminary Ridge; but before it got fully into position to effect this object the divisions of Schurz and Barlow deployed and advanced to meet it. Rodes had already established batteries on high ground to the right of the First from whence they obtained an enfilading fire along Seminary Ridge. Dilger's Ohio battery of Napoleons, accompanying Schurz's division, engaged two of these batteries, and being soon afterwards joined by Wheeler's N. Y. battery of 3-in. rifles, a spirited contest ensued, in which the Federal batteries were successful in driving their adversaries from their position, inflicting on them heavy loss in men and horses; some of their guns had to be drawn off by hand, so much were the batteries used up.

Schurz's Division was deployed on the left and Barlow's on the right, but in deploying the latter extended so far to the right as to be in a measure detached. Rodes left Doles' Brigade to hold Barlow until the arrival of Early's Division, known to be near at hand on the York road, and in such position as to strike Barlow in the flank. Doles was suffering severely when Early arrived to his assistance. Early says of his attack:—"I immediately ordered my troops to the front, and formed my line across the Heidlersburg road. * * * Jones' battalion of batteries was posted in a field on the left of the road, immediately in front of Hoke's Brigade, so as to fire on the enemy's flank, and, as soon as these dispositions could be made, a fire was opened upon the enemy's infantry and artillery with considerable effect." The artillery he here refers to was Wilkinson's battery G, 4th U. S. Artillery, which had accompanied Barlow to the front. Early goes on to say:—"Gordon's Brigade was then ordered forward to the support of Doles' Brigade, which was on Rodes' left and was hardly pressed by a considerable force of the enemy, which had advanced from the direction of the town. After a short but hot contest, Gordon succeeded in routing the forces opposed to him, consisting of a division of the Eleventh Corps, commanded by

Brigadier-General Barlow of the Federal army, and drove it back with great slaughter, capturing among a number of prisoners, General Barlow himself, who was severely wounded." Although Early seems to claim all the credit of this for the brigade of Gordon, the facts were that Doles attacked Barlow at the same time in front, thus bringing against Barlow's two diminutive brigades two of the Confederate heavy brigades, and, in addition, a far superior number of guns.

Wilkinson's battery suffered severely from the hot infantry and artillery fire to which it was exposed. Wilkinson was, himself, mortally wounded, devolving the command of the battery on Lieutenant Bancroft, who handled it with skill, and by changing position several times was enabled to hold the enemy in check and finally got off with his guns. This battery was exposed to the fire of three batteries sent especially to subdue its fire. Barlow's Division, thus driven back, retired through the town and took position on Cemetery Hill. It was the same division which, under Devens, occupied the right of the Eleventh Corps at Chancellorsville, where it was struck in flank by the whole of Jackson's Corps, without an opportunity of making a stand.

The falling back of Barlow's Brigade uncovered the right of Schurz's line to attack from the whole of Early's Division; this, too, while it was engaged in front by the other three brigades of Rodes' Division, those of O'Neal, Iverson and Ramseur; the first of which was driven back in disorder; a large part of the second captured, while the third suffered severely. Rodes, in his report says:—"All the troops were in the woods excepting Doles' and O'Neal's brigades, but all were subject to some loss or annoyance from the enemy's artillery. This artillery fire became so annoying that I ordered the Alabama brigade (O'Neal's) from the line it had occupied to fall back abreast with Iverson, so as to obtain some shelter for the troops. Finding that the enemy was rash enough to come out from the woods to attack me, I determined to meet him when he got to the foot of the hill I occupied. * * * Carter's whole battalion of batteries was by this time engaged hotly—a portion from the right, the remainder from the left of the hill—and was subjected to a heavy artillery fire in return." The heavy artillery fire he refers to was that before mentioned from Dilger's and Wheeler's batteries. Rodes, proceeding in his description of the battle and of how his troops fell into disorder, says:—"Iverson's left being thus exposed, heavy loss was in

flicted upon his brigade, his men fought and died like heroes. His dead lay in distinctly marked lines of battle. His left was overpowered, and many of his men, being surrounded, were captured." Rodes describes the fight he had with the Eleventh Corps as being very severe. But Schurz's Division, being attacked like Barlow's in both flank and front by overwhelming numbers, was forced also to give way and withdraw through the town to Cemetery Hill. To assist in doing this with safety, Heckman's Ohio battery was sent forward to the further edge of the town, where the guns were served with good effect until the enemy were among them. Heckman then retired, but with the loss of one gun, and with his battery so much crippled that it was sent to the rear, and not again called into action. The other battery of this corps, retaining its position on Cemetery Hill, was engaged several times during the day at long range, and did excellent service in holding the enemy in check until the troops could reach the hill.

The two divisions present of Ewell's Corps consisted of 39 regiments, and 8 batteries of about 36 pieces. The Eleventh Corps, including the division held in reserve on Cemetery Hill, consisted of 26 regiments with 5 batteries of 26 pieces. It may be remarked that while most Federal batteries had each six pieces, but few of those of the Confederates had so many; a few even had only two pieces; the average was about four and one-half. While the precise number is ascertainable only in a few cases, that of the Federal batteries is known with precision from the records.

The reputation overshadowing the Eleventh Corps from its misfortunes at Chancellorsville was made still more sombre by the hasty judgment formed by its falling back on this occasion. The facts were, that so long as its two small divisions were opposed only by Rodes with about equal numbers, it not only held its ground but was making some headway; when taken in flank by the arrival of Early's troops, which gave the enemy great superiority in numbers as well as in position, it was forced to give way. Its arrival at an opportune moment, and its fighting, prevented Ewell's Corps from coming in at the back door, as it were, and seizing Cemetery Hill while the First Corps, engaged with Hill's Corps, on Seminary Ridge, was defending the front entrance.

While the chief part of Rodes' Division was engaged against

the Eleventh Corps, a portion of it worked around further towards its right and became engaged with the right of the First Corps, now heavily pressed by Hill in front; and after the arrival of Early to hold in check the Eleventh, Rodes turned his entire attention to the First.

It will be remembered that when Wadsworth's Division first arrived at the Cashtown road it repulsed an attack of the enemy, driving him back across Willoughby's Run, capturing General Archer and many other prisoners. This was but a reconnoissance in force by Hill to ascertain the strength and position of the Federal troops. Finding them to be somewhat numerous he formed Heth's Division in line of battle, supported by Pender's in a second line, and about 3 P. M., moved forward and, crossing Willoughby's Run, drove the advance of the First Corps steadily back to Seminary Ridge, where the entire corps took position, with Robinson's Division on the right, Wadsworth's in the centre and Rowley's (Doubleday's) on the left, about the Seminary premises, at which place some of this last division erected slight barricades with fence-rails, which subsequently proved of great service to them. The batteries were posted upon this line, which was somewhat straggling and irregular, in the following order: Stewart's of the 4th U. S. Artillery, on Robinson's right; Steven's Maine, a little further to the left, while Reynolds' and Cooper's Pennsylvania were near each other on the right of the Seminary. Hall's Maine battery had been so badly cut up in the fight earlier in the day as to require to be sent to the rear.

The enemy continued to advance steadily across the space between the two crests, but when the first line was within about a hundred yards of the Seminary, a portion of Stewart's battery was swung around so as to enfilade it. This, with the fire of the other batteries, checked the enemy for a moment, but it was only for a moment, for the second line under Pender pushed on and now took the lead. The pressure of this fresh division in front and that of Rodes' now on the right flank—in number of men as well as in guns about three times that of the First Corps—was too great for it to stand, and it was forced to retire to Cemetery Ridge, which was done without hurry or confusion, the regiments turning from time to time to check the enemy's advance by volleys of musketry. A few of the regiments, however, became confused by meeting with the Eleventh Corps in the streets of the town and lost thereby heavily in prisoners. The batteries, al-

though they had suffered severe loss in both men and horses, were able to bring off everything except one piece, which, while retiring, had its horses disabled and was, of necessity, abandoned.

The enemy pressed hard after the retiring troops, and by ascending the slopes to the northeast of the town, endeavored to turn the right of the Eleventh Corps, but his line was quickly broken by the fire of Wiedrich's battery, in position on Cemetery Hill. The Eleventh Corps took position on the northwest face of the hill, while Wadsworth's Division of the First was sent to hold a smaller hill or ridge on the right connecting with Culp's Hill, which latter was a short time afterwards occupied by part of the Twelfth Corps. The other two divisions of the First were massed near the left of the Eleventh, in readiness to move to any point threatened. The batteries of this corps were posted by Wainwright on the right of the gateway of the Cemetery, covering all approaches from the northeast and also commanding the town. Those of the Eleventh Corps were posted by Major Osborne, chief of artillery of that corps, on the left of the gateway, commanding the ground looking towards the Seminary and also the town. All the pieces were put in battery and each protected from sharpshooters by a slight gun-pit.

The enemy, seeing the strength of the position occupied by his adversary, seemed to be satisfied with the success he had already accomplished and desisted from further attack for the present.

The contest of this day would have been considered a great battle of itself, had it not been for the overshadowing magnitude of those of the next two days. The First and Eleventh Corps threw themselves boldly across the roads by which the enemy was concentrating in Gettysburg, and by stout resistance held him in check until it was too late in the day for him to seize upon Cemetery Hill and the ridge to Round Top. The advantages of this position were decisive of the campaign. Holding it from the enemy, as did the First and Eleventh, gave time for the arrival of the other corps, after which it proved secure against every assault.

The management of the artillery in this day's contest—that of the First Corps by Colonel Wainwright, and that of the Eleventh by Major Osborne—was skillful and effective, the only drawback being that they were without other field-officers to assist them in locating batteries, which the conditions of the bat-

tle required to be widely separated. They were also badly off for the necessary staff; batteries had no officers to spare for this purpose. The battery brigade system was of such recent origin as not yet to be in full completeness in these respects; but it will be observed that all the batteries of both corps were fully engaged, and almost invariably on the front line where they could do the best work. There were none standing in idleness because of being attached to divisions or brigades occupying positions where they could not operate, but all were put in where they could do the most good for the whole. There was no frittering away of infantry commands by the detail of regiments to act as *supports* to batteries. The whole infantry line was the support. All of the infantry was engaged and every piece of artillery, and they formed mutual supports.

The guns of the enemy, greatly superior in number, being skilfully handled and vigorously worked, caused some loss to the material of the Federal batteries, which, however, inflicted equal loss upon their adversaries. There were but two pieces lost to the enemy,—one from each corps.

About sundown of this day,—the 1st,—Slocum arrived with the Twelfth Corps, one division of which was placed on Culp's Hill in prolongation of Wadsworth's Division of the First, which, as before stated, occupied a short connecting ridge between this and Cemetery Hill. The other division took position on the left of Cemetery Hill, but early on the following day was moved over and stationed with the division already on Culp's Hill, where they both covered themselves as speedily as possible with rude breastworks and abattis, overlooking the steep declivity of the hill and the narrow, marshy valley of Rock Creek at its base. This intrenching subsequently proved of great service, as it enabled a small portion of the troops to hold the line, or at least a part of it, while the remainder were absent at a most critical moment assisting to repel an assault of the enemy on Cemetery Ridge. The line thus occupied by the Twelfth, being both rocky and wooded, afforded no available position for batteries, which, four in number, were massed in rear ready for any service. Later in the day, however, one battery was moved up on the line to suppress the annoyance given by a couple of the enemy's batteries on the high ground beyond the creek. A spirited artillery duel ensued in which the Federal battery came out victorious.

About the time of Slocum's arrival, in the evening, Birney came up with his division of the Third Corps and took position on Cemetery Ridge on the left of the troops already there, and during the night was joined by the other division of this corps under Humphreys.

Meade, who was still back at Taneytown, being advised that the position at Gettysburg was favorable, determined to give battle there, and early in the evening of the 1st issued orders for all the corps to concentrate there with the utmost despatch, at the same time directing all indispensable trains and other impedimenta to be sent to the rear to Westminster. The two batteries of 4.5-in. rifles were, as previously stated, strangely included in this; and thus the valuable services of these long-range guns were lost upon a field most eminently adapted to them. Meade arrived on the field early in the morning of the 2d, and as soon as it was sufficiently light made an inspection of the position, and gave directions as to the posting of troops. About 7 A. M. the Second and Fifth Corps arrived; the former taking position on Cemetery Ridge near the hill, while the latter was held in reserve pending the arrival of the Sixth, which, having a march of over thirty miles to make, could not arrive until much later in the day; it did not in fact arrive until 2 P. M., about which time Lee was commencing his attack on the angle at the Peach Orchard. The Fifth then moved to the base of Little Round Top, and soon took an important part in repulsing the attack.

The whole of the Federal army was now up and ready for battle. All of Lee's army was up also, excepting Pickett's Division of Longstreet's Corps, which did not arrive in time for the battle of this, the 2d of July.

Lee says it was not his intention to deliver a general battle so far from his base, unless attacked, but coming unexpectedly upon the whole Federal army, to withdraw through the mountains with his extensive trains would be both difficult and dangerous. At the same time he says he was unable to await an attack on account of the state of his supplies. A battle had, therefore, become, in a measure, unavoidable, and the success already gained—alluding to the battle of the first day—gave hopes, he says, of a favorable issue; whereupon he ordered up Longstreet's Corps and the two absent divisions of Ewell's and Hill's Corps. Ewell's Corps continued upon the north side of the town, threatening Cemetery and Culp's hills, while Hill's Corps continued on

Seminary Ridge threatening Cemetery Hill and Ridge from the westward. Thus the two corps formed a right angle with each other, with the town and Cemetery Hill within the angle. When Longstreet's Corps arrived, which was early in the afternoon of the 2d, he took position on the right of Hill, inclining his right through the woods, towards Little Round Top. The numerous artillery of these corps was posted on the hills and ridges occupied by the infantry.

Lee determined to make his principal attack on Meade's left near Little Round Top, for the purpose of gaining a position from which it was thought his artillery could be brought to bear with greater effect, by an oblique or enfilading fire along Cemetery Ridge. While Longstreet was making this attack, Ewell was to make demonstrations on Cemetery and Culp's hills, to be converted into a real attack should a favorable opportunity offer. Hill was ordered to threaten the Federal centre, to prevent reinforcements being drawn from either wing, and to give assistance, as occasion required, to both Longstreet and Ewell.

The Federal position upon Culp's and Cemetery hills was that of a crescent with the convex side towards the enemy. Culp's Hill formed the right cusp of the crescent, while the others, extending in a straight line along the Cemetery Ridge, terminated at Little Round Top. The extreme right of the line, on Culp's Hill, was therefore almost in rear of the centre upon Cemetery Ridge, and distant therefrom only about half a mile. It was therefore not difficult, owing to the form and shortness of the line, to reinforce one part of it from another.

The enemy was forced to occupy an extensive line, necessarily of much greater extent; so great in fact as to make it impracticable in an emergency to reinforce either wing from the other. Even the communication of orders and information was so much delayed by the distance as to make abortive the simultaneous movements attempted by Lee. As a partial offset to this very great disadvantage, his artillery had a concentrated fire upon the Federal position, and not only this, but a reverse fire to some extent also; many of his shots, passing over Cemetery Ridge, reached Culp's Hill in rear, while Cemetery Hill had a cross fire directed upon it from every direction.

Early in the morning of the 2d, as soon as it was daylight, General Hunt, chief of artillery, made an examination of the field, respecting the arrangement of the artillery for the coming

battle. Commencing on the right, he found the batteries of the Twelfth, First and Eleventh Corps as before stated, viz.: those of the Twelfth, four in number, under Lieutenant Muhlenberg, the Corps chief of artillery, in support of the infantry line on Culp's Hill, but not directly in position. Those of the First Corps, likewise four in number, under Colonel Wainwright, on the northern side of the Cemetery crowning the hill, and those of the Eleventh, four in number, together with what remained of Hall's battery from the battle of the day before, under Major Osborne, on the west side of the Cemetery. Still further to strengthen this position, five additional batteries were ordered to Osborne from the Reserve, thus placing at his disposal six 20-pounder Parrotts; twenty-two light rifles, and eighteen Napoleons, altogether, forty-six pieces, in addition to the twenty-four under Wainwright, for the crowning of this hill. This arrangement of guns brought under a commanding fire all the positions, lying within range, that the enemy could occupy with his artillery. At various periods during the progress of the battle all of these guns were brought into requisition, and did most effective service, in fact prevented this all important point from falling into the hands of the enemy. The eight long-range rifles sent back to Westminster as impedimenta, contrary to the advice of the chief of artillery, would have found, if brought up, a rare opportunity for keeping at a distance batteries of the enemy that did considerable damage during certain periods of the battle. As it was, the guns upon this hill compelled the enemy to make a long detour from one wing to the other of his army,—one of the results attending the great range of modern artillery.

The five batteries of the Second Corps were on the line of battle of that corps on Cemetery Ridge. None of the other corps—the Third, Fifth and Sixth—had yet taken position on the line, but their batteries were on hand in readiness for it.

Meade, after an inspection of the situation, gave directions as to where the arriving troops should be posted, but made no material change with reference to those occupying Cemetery and Culp's hills. The Second Corps, Hancock commanding, was directed to occupy that portion of Cemetery Ridge next the Hill, and to connect with the left of the Eleventh, which continued to occupy the western face of the hill. The Third Corps, Sickles commanding, connecting with the left of the Second, was to prolong the line towards Little Round Top. The Fifth, Sykes com-

manding, to be held in reserve near the latter place pending the arrival of the Sixth, under Sedgwick. Upon the arrival of the latter corps, the Fifth moved to the assistance of the Third, now heavily engaged with the enemy, and became itself deeply involved in the battle raging for the possession of Little Round Top and the left of Cemetery Ridge.

Sickles, not fully apprehending his instructions, moved his corps to the front of Cemetery Ridge, to the line of the Emmitsburg road, which, crossing from the town, skirts the western face of Cemetery Hill, and, diverging at an acute angle from Cemetery Ridge, follows a secondary ridge or swell of ground lying between Cemetery and Seminary ridges. Along, or near this road, Sickles posted Humphreys' Division with its right some distance from the left of the Second, while its left rested at a peach orchard about a mile in front and a little to the right of Little Round Top, and but a few hundred yards from that part of Seminary Ridge upon which the enemy was then taking position for the purpose of carrying out his plan of attacking the Federal left. Birney's Division was posted at right angles to that of Humphreys', with its right resting in the peach orchard and its left on a rocky knoll in front of the base of Little Round Top, and overlooking a gloomy pedregal known as the "Devil's Den." Birney's small division had to cover about three-fourths of a mile of battle front, and was consequently thin and weak; and while it had in its rear some open fields, its immediate front was covered by the dense woods surrounding the "Devil's Den," and by strips of timber in front of its right. Beyond these strips of timber were open fields screened from view and advantageous to the enemy for his formations and the posting of his batteries.

The advanced position of the angle at the Peach Orchard enabled Lee to envelop it, and to enfilade both of its faces; that occupied by Birney from Seminary Ridge, and that by Humphreys' from the positions Longstreet was then taking up on and near the prolongation of the Emmitsburg road. Not only were these faces enfiladed, but they were each taken somewhat in reverse. It was a position, too, that could not be reinforced without exposing the assisting troops to the same disadvantages, and this without hope of successfully maintaining the position.

Meade had the disadvantage of having an army divided up into small corps, most of which were but little larger than divisions should have been: each of which was an independent

command, without any intermediate command between him and the corps. Under such conditions it is physically impossible for a general to exercise such supervision over the entire field as will prevent mistakes similar to that which now befell the Third Corps.

The artillery of this corps was disposed of by Captain Randolph, its chief of artillery, by posting Smith's N. Y. battery of six rifles, on the rocky knoll, before mentioned as situated on the edge of the "Devil's Den" and in front of Little Round Top, where it was supported by Ward's Brigade of Birney's Division. Somewhat to the right and rear of this knoll was Winslow's N. Y. battery of six Napoleons, posted in a wheat-field, but separated from Smith's position by a strip of woods. Clarke's New Jersey battery of six rifles was still farther to the right, near the Peach Orchard, while Ames' N. Y. battery of six Napoleons, from the Artillery Reserve, was in the orchard. All of these batteries were on Birney's front to fire to the southward and were greatly obstructed in the field of fire by the woods and strips of timber before mentioned, while at the same time they were exposed to a heavy flank fire from the batteries of the enemy posted on Seminary Ridge.

On Humphreys' front, to fire to the westward, were posted Randolph's Rhode Island battery of six Napoleons and Seeley's battery of the 4th U. S. Artillery, also of six Napoleons. About the time this disposition of the Third Corps was made General Hunt reached the locality, and seeing the weakness of the position and the danger threatening it, ordered up with all haste, Colonel McGilvery's brigade of five batteries from the Artillery Reserve which was fortunately near at hand. Fourteen of the twenty-six guns composing this brigade took position on Birney's front while the remainder were sent to strengthen that of Humphreys'.

At the same time Captain Ransom was ordered up with three batteries of eighteen guns from the brigade of regular batteries of the Reserve. On this front were therefore assembled seven batteries, of 42 pieces—14 rifles and 28 Napoleons. On Birney's front were an equal number of batteries, consisting of 38 pieces—18 rifles and 20 Napoleons; in all 80 pieces, 50 of which were from the Artillery Reserve. The ground in front of Birney was, as just described, unfavorable for artillery. The strips of woods covering the rough ground in front screened the

enemy from view, and it was only through a few openings that the batteries were enabled to obtain a good fire; and when, during the hottest period of the fighting, the infantry pushed forward to meet the enemy in the woods, the batteries could not follow by reason of the rocky and woody obstructions.

In front of Humphreys' position, and around the Peach Orchard, and through the woods, among the bowlders and around the base and upon the sides and crest of Little Round Top, took place, during this afternoon (July 2d) the hardest and fiercest struggle of this eventful battle. Lee's attack of the following day, usually termed "Pickett's Charge" made across open fields and in full view, is better known to the world, and is generally taken as the high-water mark of the rebellion—as that point from which its military power and hopes began to recede and grow less to the end. As grand as was Pickett's charge it was but a reckless dash compared with the prolonged and persistent efforts put forth by Lee to crush Meade's left and secure the vital advantages of Little Round Top. The closeness with which he came to reaching this end made the battle of this day the real turning point of the battle and of the war.

The movement which Sickles made to the front with his corps broke its connection with the Second on its right. To fill up, as much as possible, this gap, two regiments of Harrison's Brigade of the Second were sent forward on the Emmitsburg road near to a brick house, at which rested Humphreys' right. Here they hastily constructed a slight breastwork of fence-rails, which a short time afterwards served them an excellent purpose. Brown's R. Island and Rorty's N. Y. batteries were also pushed forward to this point, and during the attack on this part of the line, following the break of the angle at the Peach Orchard, did splendid service, but with heavy loss in men and horses. Brown, himself, was wounded, and his battery so much cut up that it was reduced to four pieces. The other three batteries of the Second Corps retained their position on Cemetery Ridge to the right of the two just mentioned, and although not so closely engaged, were, nevertheless, able to do a good part in assisting to repulse the enemy, who, after forcing back Sickles' Corps, was now following up the advantage of his onset, and upon the point of breaking the more natural position of Cemetery Ridge.

(To be continued.)

A PLEA FOR THE COLORS.

By CAPTAIN MOSES HARRIS, 1ST U. S. CAVALRY.

THE transformation of the raw recruit into an instructed, disciplined and seasoned soldier, fitted to encounter the hardships of the field and the dangers and trials of battle, is a slow and tedious process ; which demands of his instructors not only infinite patience and self-control, but an intimate knowledge of human nature together with wisdom to make use of all means for the development of the higher qualities of manhood. The new methods of drill and instruction are admirably adapted to perfect the physical training of the soldier, to develop his powers of endurance and awaken his intelligence. But physical training alone will not make the perfect soldier. The final test of the battle-field is soldierly valor ; and while this quality cannot be produced with the same facility as muscle, yet it is possible, through the education of the soldier, to conserve and develop those high and noble instincts which perfect and crown his efficiency. The recent improvement in disciplinary methods lends powerful aid to this purpose, and there is reason to hope that the progressive tendency towards a condition of discipline which will preserve the manhood and self-respect of the enlisted soldier will continue.

It may be acknowledged that personal courage is largely dependent upon the condition of the physical system. "Mens sana in corpore sano" is a maxim which nowhere finds more valuable application than in the soldier's life. The nervous system, to withstand the strain of long and tiresome marches, sleepless nights, incessant danger and the final conflict of arms, needs to be sound and free from impairment by excess of any kind. There is, however, a more subtle element. "True valor lies in the mind."

"The brave man is not he who feels no fear,
But he whose noble soul its fear subdues,
And bravely dares the danger nature shrinks from."

It is this quality of the soul which has inspired to noble deeds since the world began, and which has received the homage and

honor of all mankind. This divine quality of the soul is peculiar to no class or condition; the aristocracy of heroism opens its ranks to the humblest mortal. The American soldier has not fallen behind those of other nations in the manifestation of this quality, and its recognition has been liberally provided for. There seems, however, a disposition to assume its existence as a matter of course, as though the mere fact of donning the uniform carried with it the acquisition of all military virtues, the necessity or possibility of developing and cultivating the ennobling impulses of the soul not being recognized.

In the uprisings of nations to overthrow tyranny, to conserve the liberties of the people, or to preserve national existence, the patriotic spirit of the people can in a measure be relied upon to furnish courageous inspiration to the armed hosts; but it may be usefully supplemented by the bond of comradeship and *esprit de corps* which attaches the soldier to his organization and makes its good name and fame dear to him. That this sentiment was strong in the hearts of the Union volunteers is made evident by the tenacity with which they cling to old associations. After more than a quarter of a century the annual re-unions of armies, corps, brigades and regiments continue to call their members from far and near, to renew those old ties and associations rendered so dear by common victories and common trials and sufferings. Their tattered and war-worn colors—symbols of imperishable glory—guarded with jealous care, are alike potent to revive the valorous impulses of the veteran's heart and kindle the fire of patriotism in the breast of careless youth. At the unveiling of the equestrian statue of General Grant, in Lincoln Park, Chicago, October 8, 1891, no incident was more affecting than the march of Grant's old regiment, the 21st Illinois, carrying at its head the remnant of the regiment's original battle-flag. That handful of grizzled veterans, bearing the flag, which through the decay of warp and woof had assumed the texture of delicate lace, seemed like the phantom of the band of young and stalwart soldiers that had marched forth under their mighty leader to defend the life of the nation thirty years before.

In times of peace patriotism cannot be relied upon to fill the ranks of the army. Men are attracted to the service by a variety of causes; love of adventure, disappointment in the affairs of life, a desire to escape from the daily round of wearying labor, and some by a genuine love for the military life. It is unnecessary

to say that this latter class are the most desirable. Unfortunately their numbers are not proportionately large, but will doubtless increase as the army becomes better known to the people and the condition of the soldier is improved. In order to attach these men of different classes, conditions and temperaments to the service, and to develop and foster those noble aspirations which prompt to valor on the field of battle, all past traditions suggest the expediency of cultivating a sentiment of love and loyalty to their regimental organizations. This subject has never received the attention in our service which it has in other countries or which its importance demands, but it is only within comparatively recent years that influences have arisen which seem to forebode an almost entire extinction of the regimental *esprit*. The reorganization, and consequent consolidation of regiments in 1870, with the wholesale transfer of officers, tended, in the infantry at least, to a weakening of regimental bonds; a tendency which has been increased and made general throughout the army by the lineal promotion of lieutenants in their several corps, and the practice of transferring the enlisted men from one regiment to another to save expense in changes of station. The frequent dispersion of regiments at widely separated posts on the frontier has been another cause which has operated in the same direction. Nevertheless the sentiment of regimental love and pride has not been entirely lost. It is present in some degree (generally proportioned to the value of the services rendered by the organization) in every regiment in the service. It may be hoped that the series of regimental histories now in progress of publication in the JOURNAL OF THE MILITARY SERVICE INSTITUTION will powerfully assist in the preservation of this sentiment, the value of which must be acknowledged even though it may not be susceptible of accurate statement.

The love and devotion which makes the honor of his regiment dear to the soldier's heart finds an object around which to centre in the colors. The standards which marshalled the armies of Israel, the defiant red flag of Greece, the white flag of Persia, the eagles of Rome, the banners and ensigns of chivalry, and the flags and standards of modern nations, have alike symbolized the object of all military valor. If the flag of the nation is honored in proportion to the beneficence of its government, what ensign more worthy of love and sacrifice than the beautiful emblem of our own glorious republic? What banner more powerful to awaken

the sentiments of patriotism and devotion? These sentiments are, however, common to the whole people and it needs only the occasion to make them manifest ; the professional soldier possesses them in no diminished degree, but the bonds of comradeship and *esprit de corps* attach him to his regiment and makes its standard the visible object of his devotion.

This, at least, is what we conceive to be the true soldierly spirit, and expresses the sentiments which should animate the breasts of the men who fill our ranks. But in how many regiments is any approach made to this ideal condition? In how many regiments do the soldiers have any conception of the true meaning of the colors, or any knowledge of the history and traditions of their organizations? In the infantry the colors have heretofore been seen on drill and at parade, and the idea that they constitute the rallying point of the regiment, to be followed, supported and protected, has not been entirely lost sight of. The knowledge and acquaintance which the average cavalry soldier has of the standard of his regiment has been gained upon those rare occasions when he has witnessed the ceremony of escorting it from the colonel's quarters to the regiment's place of parade ; a ceremony to which he attaches little meaning and which he is apt to look upon as a device to protract the tediousness of the parade or review. Is it not worth while to enquire whether valuable and tangible results might not be obtained by the systematic instruction of the enlisted soldiers in the significance of the colors, the meaning of the honors which are paid to them, and in the history and traditions of their regiments?

The moral obligations which bind the soldier to the service are at present expressed solely in his oath of enlistment ; and comprehensive as are its terms, even when all the resources of the recruiting office are exhausted, but little solemnity or impressiveness can be imparted to its administration. The wise recommendation of the Adjutant-General of the Army that the oath of enlistment be renewed after the soldier has joined his regiment will, if adopted, afford an occasion which can be utilized, after the manner of most foreign services, to formally present the recruits to the colors. The aid of religion should be invoked to make the ceremony solemn and impressive, and as the "*sacramentum militare*" of the Romans pledged the soldier to die rather than desert his standard, so the terms of this oath should bind the soldier to his regiment, his colors and his comrades. The instruction of the

soldier in the beauties of loyalty and devotion should not end with this ceremony. He should, by frequent lectures and addresses, delivered by the historian of the regiment or some other suitable person, be made acquainted with the history of his regiment. Its valorous achievements should be as familiar to him as the events of his own life, and he should become accustomed to the thought that sacrifice and devotion for the honor of the regiment and its standard is his own high privilege and honor. Can it be doubted that by this instruction an additional bond would be formed which would effectually tend to abate the evil of desertion? The soldier's oath "to bear true faith and allegiance to the United States of America" is too comprehensive to impress its significance upon the careless mind of the youthful recruit. Probably few men who desert admit to themselves that they thereby violate their allegiance to the United States. They reason, when they reason at all, that they can serve the United States just as faithfully in a civil capacity; and when peace reigns they perceive no especial necessity for faithfulness to the military service. The average mind of the soldier needs something more tangible as an object of attachment, and under a proper system of cultivation and development there can be little doubt that he would find this object in his regiment and its standard.

The development of this sentiment of attachment and loyalty will not be encouraged by ascribing to the colors some mysterious and occult quality, and hiding them away to be brought out only upon special and important occasions. They should be displayed at every parade of the regiment under arms; the soldier should become familiar with their appearance and accustomed to regard them as possessing real and practical value. The original purpose of the standard was that of a rallying point in battle; a visible signal by which the ranks regulated their advance or retreat; "a telegraph in the centre of the battle to speak the changes of the day to the wings." It has always meant something to fight for, something to protect.

History abounds with illustrations of the soldier's devotion to his ensign. Caius Cassius, on the fatal plains of Philippi, slew the standard bearer who was turning back and tore the banner from his grasp. His cowardice, which imperilled the sacred emblem, made him the foe of his own comrades. The colors, as emblems of honor and glory, are no less prized by the Saxon race; and

Kinglake, in his description of the battle of the Alma, has told us how the English soldier fights for them.

"Then a small, childlike youth ran forward before the throng, carrying a color. This was young Anstruther. He carried the Queen's color of the Royal Welsh. Fresh from the games of English school life, he ran fast; for, heading all who strove to keep up with him, he gained the redoubt, and dug the butt end of the flag-staff into the parapet, and there for a moment he stood holding it tight and taking breath. Then he was shot dead; but his small hands, still clasping the flag-staff, drew it down along with him, and the crimson silk lay covering the boy with its folds; but only for a moment, because William Evans, a swift-footed soldier, ran forward, gathered up the flag, and, raising it proudly, made claim to the Great Redoubt on behalf of the Royal Welsh. The colors, floating high in the air, and seen by our people far and near, kindled in them a raging love for the ground where it stood."

The brave color-bearer, whose heroic progress up the craggy side of Lookout Mountain, leading the advance of Hooker's forces, was witnessed by the veterans of the Army of the Cumberland from its neighboring position on Missionary Ridge, will live in history even though his name may be unknown.

The value which the standard possesses as an incentive to soldierly conduct is derived exclusively from its association with the conflict of battle and deeds of heroism. If we store it in a place of safety at the opening of the campaign, or send it to the rear when the fighting begins, it must lose its power to stir the hearts of men to noble deeds, and, no matter how costly its silk and embroidery, will possess no more sentimental value than the record books of the regiment, and the honors which are paid to it will be as meaningless as the fetish worship of the African savage.

The American people are not especially susceptible to sentimental influences, but the value of sentiment as a fighting force was too well demonstrated on Southern battle-fields to admit the belief that the lesson can be entirely forgotten. At the beginning of the war there was no lack of patriotism, but it took four years of comradeship in danger and suffering to make evident the strength of the bond symbolized by the standards around which the soldiers of the Republic rallied. The fact that some regiments in taking the field stored for safe keeping the embroidered colors

which had been presented to them, preferring to carry the less expensive and more serviceable ones issued by the Government, is an evidence that the true significance of the colors was little appreciated. Had they apprehended their true meaning they would rather, a thousand times, have lost them in fair and courageous battle than to have retained their possession by such ignoble means. And upon their return from the field which think you were most prized; those whose rich silk and dainty embroidery had been preserved in the security of the storage warehouse, or those tattered and war-worn relics—silent witnesses of endurance, valor and devotion—sanctified by the blood of brave soldiers shed in their defense? The sentiments expressed by the author of "*A Summer Night's Dream*" find fit application here. After his thrilling account of the "fight for the colors," he says:

"Was that not a white-livered time when the colors remained behind on troops going into action? When they were hidden in some God-forsaken corner of the battle-field, under the escort of a sergeant and some privates, till the battle was over; or if reports do not lie, were, on the eve of a fight, even ordered to be kept with the baggage? What will future generations say of an age, in which on parade ground the most accurate close order and the greatest exactness of movement was insured by the use of an unrivalled discipline, which yet on the battle-field chose dispersion and gave up control? What will they say of an age in which the colors marched proudly in front on parade, but during an action skulked away?

"Was not Bernadotte, whose boast it was never to have lost a gun, notoriously a general who never committed himself seriously. When any beaten army finds comfort in having lost neither colors nor guns, you may generally offer it the cold consolation that had the guns run the risk of capture and had the colors been in front of the regiment, it would probably not have been beaten. To a brave corps the color means 'death or victory,' no fear of disgrace being attached to such a color, if, after a desperate battle, it does fall into the enemy's hands. If, however, some daring squadron of the enemy should capture colors hidden away behind the battle-field, or even with the baggage, then the most heroic deeds in battle cannot wipe away such a slur."

Present regulations provide that the regimental colors of the infantry and artillery will be carried with the troops only on occasions of ceremony; and that on other occasions they will be

left in proper custody at the station of the troops. In the adoption of this rule it cannot be assumed that the importance of the colors as an inspiration to heroic effort in the stress of battle was lost sight of or forgotten. Their value has been attested on many well-fought fields, but we need only here recall the part which they bore in that magnificent feat of arms, the storming of Missionary Ridge. Van Horn says :

"The color-bearers sprang to the front, and as one fell another bore the flag aloft and onward, followed by their gallant comrades, not in line, but in such masses as enabled them to avail themselves of easier ascent or partial cover. * * * When more than a half hundred battle flags, forming the foremost line, approached the crest, the Confederate soldiers knew that they would wave over their defenses, or those who bore them, and a moiety of the twenty thousand men who followed would fall." General Sheridan in his *Memoirs*, says :

"There seemed to be a rivalry as to which color should be farthest to the front ; first one would go forward a few feet, then another would come up to it, the color-bearers vying with each other as to which should be foremost, until finally every standard was planted on the works."

In looking further for causes which may have had influence in producing the restrictive regulation with reference to the use of colors, we are equally debarred from presuming that in a matter of such immense importance considerations of economy could have had any weight. We may therefore conclude that the explanation is to be found in the tactical changes incident to the introduction and use of breech-loading arms ; and as tactics are liable to change and modification with every new invention in arms or explosives, the subject is always open for discussion. If it is thought that the colors afford a too conspicuous target for the destructive fire of improved arms, it should be considered that the necessity of soldierly valor and steadfast devotion is also greater than ever before, and that no means should be neglected to cultivate and develop these qualities. If the positions of the color-bearers and the color-guards are more dangerous than formerly, the proper remedy would seem to be found in making them more honorable. When suitable distinctions and rewards are attached to places of honor, no matter what the danger may be, brave soldiers will not be wanting to fill them. It may, however, be doubted if the position of the color-bearers has, relatively

speaking, acquired any additional danger from the increased destructiveness of fire. Certainly, the assault of a position may be a more serious matter than in the days of muzzle-loaders, but increased rapidity of fire does not imply increased accuracy. With the muzzle-loader the time and care necessary to load and prime the piece compelled a concentration of thought and effort that was conducive to quiet nerves and steady marksmanship. The difficulty of loading added to the value of the shot and impelled the soldier not to waste his labor by careless aiming. Under the excitement of rapid fire with breech-loading arms, the aim of the soldier is likely to be much less accurate, reliance being placed on the number of shots fired rather than upon marksmanship. In this connection the following extract from a published report of Captain S. E. Blunt, of the Ordnance Department, is of interest: "Some loss of accuracy, from the marksman's standpoint will probably accompany the use of smokeless powder, but as the trajectory is flat the effectiveness of the weapons in action is not impaired."

The purpose of this paper does not admit of any extended discussion of tactical questions; attention may, however, be invited to the fact that the use of the extended order in the attack, and the advance of the firing line by alternate rushes, does not obviate the necessity under fire of successive lines of troops in more or less compact order and without the advantages of shelter. The purpose of the firing line is, in conjunction with the artillery, so to restrict the fire of the defenders by the energy of its fire as to make it possible for the main body to advance to assaulting distance without excessive loss. If the increased flatness of the trajectory and extension of the dangerous space obtained by the use of smokeless powder is anything like what is claimed, the supports of the firing line cannot be advanced nearer than 700 or 600 yards from the hostile position without sharing with the advanced line the full effect of the defenders fire, and the most effective method of attack may after all be found to consist in the pushing forward of a strong line, when within about 800 yards of the position, for the purpose of giving the utmost possible development of fire action. However this may be, it seems certain that in the advance of the main body and the reserves, the colors will retain all of their ancient value in guiding the onward march of the shaken ranks through death and danger. And in that supreme effort of the final charge, when the din of conflict drowns

the voices of the leaders, when men are falling fast, and the presence of death dulls the senses of the living, who can doubt their power, when pushed forward by strong arms impelled by courageous and resolute hearts, to lead their sworn defenders to the goal of victory ?

The destructive power of modern arms renders it vitally necessary to increase the mobility of the troops by every possible means, and as the size of the colors now carried by the foot regiments may render them somewhat heavy and unwieldy, there appears to be no good reason why they should not be made smaller, especially as it may be expected that future battle-fields may be in a measure free from the smoke which has heretofore been an element of obscurity. The national color should, however, be large enough to be plainly distinguished at considerable distances, that the character of the troops may be unmistakably declared and awkward mistakes avoided.

There can be but slight difference of opinion concerning the position of the cavalry standard. There can be no idea suggested that the charge may fail, without to some extent impairing its vigor and effect. Therefore, as long as the standard has the power of arousing in the breasts of the troopers any sentiment of love and loyalty, it should be given the place of honor in the fore-front of the charge, in full confidence that it will lead its devoted followers to victory and honor.

It seems impossible to believe that the time will ever come when colors will cease to be of value as rallying points in battle. Is it not then the part of wisdom to conserve their ancient meaning as symbols of honor and glory and make them the visible bond which unites the soldier in loyalty and honor to his comrades and his regiment ?

Our military studies are so intensely practical in their nature that we are wont to forget that the profession of arms has its æsthetic side. We cannot dispense with that sense of duty which we cultivate in the soldier by methods of discipline, but it is possible to render its cold abstractions more attractive by a recognition of those qualities of sentiment which animate the human heart. We take the soldier from his home and kindred, and the refining and elevating influences of the gentler sex at the most receptive age, when the impulses of the soul are strong for good or evil. Shall we not permit him to find in his regiment and its standard legitimate objects of attachment and devotion ?

ON CERTAIN DISEASES WHICH HAVE BEEN EPIDEMIC IN ARMIES.

BY MAJOR CHARLES K. WINNE, U. S. A.,

MEDICAL DEPARTMENT.

AS a purely technical subject is not attractive in itself, this little study in military medicine has been developed more in its historical than in its professional relations, from such authorities in history and medicine as have been available for consultation, and therefore makes no attempt at originality.

Instances in which armies have been destroyed by either the great agencies of nature alone, or by the great agencies of nature plus the opposing force of the enemy—such as the destruction of the host of Meneptha II.—that of Cambyses in his African campaign—the defeat of Crassus by the Parthians—the extermination of Varus—or the disastrous Russian campaign of Napoleon—do not fall within the scope of this paper, which is confined solely to the effects of disease on troops.

As the geographer has divided the surface of the globe into imaginary zones, and mapped out isothermal lines of temperature, with contours of elevation; as the naturalist has delineated areas of animal, plant, and insect life, some forms of which are diffused, while others are restricted in their habitat; so the medical geographer has described areas of disease, some strictly confined to certain localities, others again which, though endemic, yet under certain conditions, extend from the endemic centre, become epidemic, and following the great lines of communication or travel, sweep like a slow tidal wave around the world; while other forms, being universally diffused, affect men the same, no matter by what seas, or under what stars they dwell.

Man, therefore, in his migration from the central area of his development to execute the great task devolved upon him of occupying and settling the earth, carried with him not only old familiar diseases, but also met new forms, which vary to some extent in their clinical significance from age to age.

In this labor of colonization or conquest, men of alien or of similar races have always been in fierce conflict with one

another, and disease is the concomitant or sequel of war, because violation of the immutable laws of the universe, in the physical as in the moral world, is followed by the inevitable retribution, retribution as certain and as implacable as the decrees of the fabled *Parcæ* or *Fates*, which even the Gods were powerless to resist.

The collection of large bodies of men together is invariably accompanied by the outbreak of disease, more or less virulent, when the laws of hygiene are neglected; all the result of ochlesis or crowd poisoning, or telluric influences, fructifying in the proliferation of bacterial forms, obscure in origin, but deadly in effect.

With the usual tendency of mankind to attribute to others the sufferings resulting from, or the penalties due to personal acts, all races are apt to ascribe pestilence to the wrath of their Gods, rather than to their own sins of omission, and to deprecate the infliction of what they are in great measure responsible for themselves. This belief, which is paramount among rude and primitive peoples as all anthropologists know, is traceable in the early literature of all races, and remains of this prehistoric or antique faith, or rather fear, have not even yet been entirely obliterated. Thus the first book of the *Iliad* describes not only the wrath of Achilles, but also the pestilence which raged in the Grecian camp, destroying both men and animals, and which was deemed an infliction from Apollo to avenge the insult offered to his priest. The poet adds with unaffected simplicity, that in addition to the propitiation offered to the offended Deity to abate the plague, they also thoroughly purified their camp.

The diseases which, either alone or conjointly, have been most potent in hampering military operations or frustrating campaigns, changing the fate of empires, are,—Malarial fevers of various grades of intensity, plague, dysentery, typhus fever and cholera, yellow fever, smallpox, and scurvy,—which can best be taken up chronologically by sections, selecting under each the most striking illustrative examples.

But there are two instances mentioned in ancient history under the vague name of pestilence or plague, which are of interest to students of all professions.

No appalling catastrophe in history has ever been described with more terseness and simplicity, or with greater dramatic power, than the ruin of the Assyrians during the reign of Sennacherib, a brilliant soldier of the 2d empire whose career ex-

tended from B. C. 705 to B. C. 680. In his last and most disastrous invasion, the Assyrian and Egyptian armies were in position near the frontier of Palestine and Egypt, when, as the Bible records it:—"And it came to pass that night, that the angel of the Lord went out, and smote in the camp of the Assyrians an hundred fourscore and five thousand; and when they arose early in the morning, behold they were all dead corpses." [II. Kings, xix. 35.] "And the Lord sent an angel which cut off all the mighty men of valor, and the leaders and the captains of the camp." [II. Chronicles, xxxii. 21.] The cause of this indescribably sudden and wonderful mortality, unless due to a local outbreak of the plague, is as inscrutable now as it was then.

Sennacherib, after this overwhelming calamity which was virtually the end of his military career, fled to Nineveh, where he was afterwards murdered by his sons.¹

Thucydides, who lived during the most brilliant period of Greek art and literature, who was the contemporary of Euripides and Phidias, of Socrates, Æschylus and Hippocrates, depicts in the history of the Peloponnesian War, the plague which (B. C. 430) devastated Athens, and which also destroyed in forty days, over 37 per cent. of the reinforcements sent to aid in the investment of Potidæa, so that the remnant was compelled to return to Athens.

[This disease however was not the Plague known to writers on medicine, which first appeared in the sixth century, and is known therefore as the Plague of Justinian.²]

MALARIA.—A morbid agent doubtless due to the development of a microscopic fungus,—in all its protean forms, both intermittent, remittent and pernicious,—is, with the possible exception of rheumatism and consumption, more widely disseminated than any other type of disease; "it has been estimated to produce one-half of the mortality of the human race; and as it is the most frequent cause of disease and death in those parts of the globe that are most densely populated, the estimate may be taken as at least rhetorically correct."³ Ordinarily generated in badly-drained, heavily-timbered or marshy tracts, or the estuaries of rivers, it disappears gradually from many of these localities when the country has been for a long time cultivated and exposed to the sun's rays, though when the soil is first broken, the diseases caused by it are apt to be most prevalent. But as these decrease in intensity, other diseases replace them, as, in the vary-

ing flora of a country, the destruction of the original forest is followed by the growth of diverse and dissimilar species. Yet malaria is also found on high or barren plateaus from Persia to New Castille, on the prairies of America, the savannas of Brazil, the deserts of Africa, and the dunes of Holland.

Excluded from the Arctic zone, there is hardly any part of the temperate or torrid zones exempt, and though only exceptionally found north of 35° north latitude or south of 20° south latitude, yet within these limits, it is as ubiquitous as the winds of heaven, increasing in virulence according to its proximity to the equator, while decreasing according to altitude; in Italy an elevation of 1400 feet being sufficient, while in the West Indies an elevation of from 2000 to 2500 feet being required to secure immunity.

Its effects have been known from the earliest ages, and were fully described by the Greek, Roman, and Arabian physicians, while it was so dreaded in Rome, and with reason, that a temple was dedicated to the goddess Febris.⁴

During the many petty wars carried on in the early days of the Roman Republic,—and which resembled probably more the customary forays of savage tribes than organized war,—military expeditions were often interrupted by the breaking out of disease, fifteen epidemics being recorded in ancient history. One pestilence in particular (during the period which elapsed between the battle of Lake Regillus, B. C. 497, and the dictatorship of Cincinnatus, B. C. 458), broke out in Rome, overcrowded with the peasantry with their cattle flying from the Volscians, and so depopulated the city that the few remaining senators were compelled to do sentry duty, both consuls, with nearly all the patricians, together with innumerable plebeians having died.

Another similar outbreak swept away many of the Gauls after they had sacked and burned the city (B. C. 387); while similar diseases also prevailed in the Roman and Carthaginian armies during the campaigns of Hannibal.⁵

It is probable that these casualties resulted from pernicious malarial fever, which had always been peculiarly rife in Italy. Rome, owing to its topography, had always been exceedingly sickly from the foundation of the city. The extensive system of drainage completed by the elder Tarquin, did much to improve the health rate, and the city was therefore comparatively healthy during the reigns of the Cæsars; but these great works falling

into ruin for a time after the conquest by the Goths, malarial fever again raged as before, and the Pontine Marshes, which had been drained, reverted to their pristine condition, and the name became then as now synonymous with malaria of a malignant type.⁷

A pernicious fever had always been endemic in the pestilential plains of Hungary and the lower Danube, where the Christian and the Turk struggled for supremacy, and whose campaigns served as a practical school of war for the youth of Europe until the scene of conflict was transferred to the Low Countries, where, on a different theatre and with other actors, a varying type of the same disease wrought havoc among the troops.

These Austro-Turkish epidemics will be referred to more at length under the section of typhus fever, as these diseases were simultaneously present and the line of demarkation was never clearly drawn.

The English troops operating in Holland between 1742 and 1748 suffered severely from malarial fevers, together with dysentery and hospital or typhus fever, and Sir John Pringle wrote an exceedingly interesting medical account of these campaigns.⁸ The disastrous Walcheren expedition took place in 1809. The English army, between 42,000 and 43,000 in number, was quite healthy when it sailed from the Downs, July 28th, but as early as the middle of August the number of the sick was so great as to excite alarm. By the 26th the number was 5000; by the 7th of September it amounted to 10,948. According to Sir Gilbert Blane, 26,846 men were sent to hospitals in Zealand between the 21st of August and the 18th of November. The expedition was paralyzed by these misfortunes, and after the surrender of Flushing (August 15th) was unable to continue offensive operations. In spite of the fact that a large number of the sick who were sent home to England began to improve as soon as they escaped from the pestilential regions in which their diseases had originated, and ultimately recovered, the total mortality was large; it has been estimated at about 8000,⁹ though but 217 were killed.

Dr. Maclean writes in regard to Wellington's Peninsular campaign that "When the British army was operating in Estremadura, the country was so arid and dry for want of rain, that the rivers and small streams were reduced to mere lines of widely detached pools; yet it was assailed by a remittent fever of such destructive malignity, that, says Ferguson who records the fact, the enemy and all Europe believed that the British host was ex-

tirpated. A fever of like malignity scourged the same army in the bare open country by which Ciudad Rodrigo is approached from the side of Portugal."¹⁰

Or as Macleod expresses it relative to the same campaigns,—to emphasize the far greater proportion of deaths from disease to the small number, comparatively speaking, who are killed or wounded,—in the Peninsular, from January, 1811, to May, 1814, during which period the battles of Albuera—the most desperate and bloody of the whole revolutionary war,—Salamanca, Vittoria, the Pyrenees, Nivelle, Nive, Orthes and Toulouse, were fought, and Badajos, Ciudad Rodrigo and Sebastian stormed, besides many lesser encounters; in an effective force of 61,500 men only 42.4 per 1000 were lost by wounds, while 118.6 were lost by disease,¹¹ and of which loss a large proportion was from the diseases mentioned by Maclean.

In the Crimean war the calamities endured by the English and French armies were so overwhelming, that Kinglake confesses that it was only by large reinforcements that either the one or the other was saved from utter extinction. In the English army, "In a period of only seven months (October, 1854, to April, 1855), out of an average strength of only 28,939, there perished in our hospitals or on board our invalid transports 11,652, of whom 10,653 died from disease alone."¹²

The causes of death in the English army were complex, and will be more specifically alluded to hereafter; they were also complex in the French army, but still, while in front of Sebastopol, according to Scrive, Inspector-General, Medical Department, there were treated, from September 1854 to July 1856, for malarious fevers of various grades,—intermittent, remittent, and pernicious,—20,623, with 2179 deaths.¹³

During the War of the Rebellion, in the Union armies, from May 1, 1861, to June 30, 1865, there were 1,213,685 cases of malarial diseases with 12,199 deaths. "But though the mortality from these fevers was comparatively light, their influence in detracting from the efficiency of the army must have been very great,"¹⁴ neither do these figures indicate the attendant suffering, the chronic malarial poisoning, terminating in listless minds, anæmic bodies, enlarged spleens and general debility, for which so many were necessarily discharged.

TYPHUS.—A contagious disease peculiar to poverty and destitution, as in the famine years in Ireland,—whose proper nidus is

in closely beleaguered fortresses, prison ships, or badly kept jails, culminating in various Black Assizes, of which there are too many examples in English history,—was originally introduced into Italy from Cyprus by Venetian mercenaries in 1501.

Some of the epidemics described in ancient history may have been those of typhus, but this point can never be positively determined, neither could the diagnosis always have been clearly drawn between plague and typhus, as certain complications occasionally observed in cases of typhus would render them liable to be regarded as cases of plague, according to the opinion of Clot-Bey who was familiar with both diseases.¹⁵ It is found only in the north temperate zone between 30 and 60 degrees, and particularly between 30 and 40 degrees north latitude. It is also essentially the disease of Europe. It is unknown in Africa, of doubtful occurrence in Asia, and the consensus of medical opinion is against its existence in Central or South America, where malarial fever has been at various times mistaken for it. Though known on the Atlantic Coast, as an imported disease, it has not been seen on the Pacific slope nor in the English speaking colonies at the antipodes.

The following instances testify as to its virulence in armies, where its effect has always been most disastrous:

"In the year 1489 no fewer than 17,000 of the troops of Ferdinand, then besieging Granada, were destroyed by a spotted fever to which the Spaniards applied the same name that they afterwards gave to typhus."¹⁶

Another noteworthy appearance of it occurred during the heroic defense of Metz in 1552 against Charles V. The losses in the Spanish army commanded by the Duke of Alva, under the personal supervision of the Emperor, from exposure and contagious disease, were so great as to compel the raising of the siege after it had continued 56 days, during which time 30,000 men perished or were killed. The Spanish camp after the retreat of the army was found "Filled with the sick and wounded, with the dead and dying. In all the different roads by which the army retired, numbers were found who, having made an effort to escape beyond their strength, were left, when they could no longer follow, to perish without assistance,"¹⁷ as was the custom in those days, when no attention was paid to the disabled, which custom has heretofore been alluded to in a paper, upon the care of wounded in war.*

* JOURNAL OF THE MILITARY SERVICE INSTITUTION, July, 1891.

The campaigns in which the armies contending in Hungary were so decimated by disease, were so thoroughly summarized by the late Surgeon J. J. Woodward, U. S. A., that the following extract is quoted from his work :

"In every considerable campaign against the Turks, in which the German Emperors invaded the Hungarian plains, from the beginning of the sixteenth century to the end of the eighteenth, a form of fever prevailed among the troops * * * so fatal as to occasion the proverb that 'Hungary is the grave of the Germans.' * * * It is now generally admitted to have been a hybrid between the endemic remittent fevers of the Hungarian soil, and spotted typhus. The attention of civilized Europe was first directed to it when, after the luckless Hungarian campaign of Maximilian II. in 1566, his pest-stricken soldiers returned to their homes. They scattered the contagion of spotted typhus throughout Germany on their way. * * * The army of Maximilian, however, was not the first German army which had suffered from the Hungarian fever. In 1542 a pestilential fever broke out at the camp before *Ofen*, in the Imperial German army, which Margraf Joachim von Brandenburg had led against the Turks. It became still more fatal during the disastrous retreat and, according to Haeser, destroyed 30,000 men. * * *

"The epidemic of 1566 is famous both on account of the manner in which typhus was spread through Europe by the disbanded soldiers, and on account of the classical description of the Hungarian fever by Thomas Jordan, who accompanied the army of Maximilian as his chief medical officer. The spring had been exceedingly wet, and the great Hungarian streams had overflowed their banks; the summer was unusually hot and dry; the German army was scantily supplied with food. When the fever first appeared the army was encamped at Komorn, at the point of junction of the Waag and the Danube,—a marshy, intensely malarial plain. It became still more destructive in the camp at Raab, where the Raab and Rabnitz empty into the Danube. Such was the devastation caused by it that Maximilian, though his force when he went into camp at Raab was about 80,000 men, did not venture to take the offensive, and saw the gallant little garrison at Zigeth captured by the Turks after more than twenty vain assaults, without daring to strike a blow in their behalf. In the early autumn he ignominiously retreated with the remains of his army. After the retreat the pestilence was especially destructive in Vienna. The hospitals could not accommodate all the sick, and the dead and the dying were scattered through the streets. Throughout all this devastation it was the German troops that suffered; the native Hungarians almost entirely escaped.

"The Hungarian fever broke out anew during the siege of Papa, in the year 1597. The Italian allies suffered most. According to Haeser, of more than 8000 of these troops, less than 1500 found their way back to Italy. * * * Again it made its appearance * * * among the 12,000 German troops who occupied Hungary under the celebrated General Montecuculi in the year 1661. The disease broke out in the swampy camp between Komorn and Neuhausel, and soon brought the fruitless campaign to an end.

"Once more it appeared in the army with which Prince Eugene besieged Belgrade in 1717. The Grand Vizier advanced to the relief of the besieged with a great army. The Turks took the offensive, and shut up Eugene, with his army of 60,000 men, in the marshy plain between the Danube and the Save. It was here that the Hungarian fever broke out, accompanied with a fatal dysentery. A large number of men had perished, when the gallant Prince, venturing all on the fortunes of a day, attacked the Turkish army and routed it after a desperate battle. The surrender of Belgrade followed, and the peace of Passarovitz was the result.

"Still more terrible were the ravages of the Hungarian fever during the disastrous campaign which the Emperor Joseph II. undertook against the Turks in 1788. Disappointed with regard to the help he had anticipated from Russia, and his troops decimated by pestilence, the feeble campaign terminated in a humiliating retreat. The imperial army at the commencement of the season numbered about 200,000 men; its losses from disease have been estimated at between 30,000 and 40,000."¹⁸

To avoid the interruption of a chronological sequence, these campaigns have been referred to *seriatim*, but the siege of Naples in 1528 was signalized by the most historically important outbreak of typhus on record.

"To obliterate the disgrace of Pavia, Francis I., in League with England, Switzerland, Rome, Geneva and Venice, against the powerful Emperor of Germany, sent a fine army into Italy. The Emperor's troops gave way wherever the French plumes appeared, and victory seemed faithful only to the banners of France, and to the military experience of a tried leader. Everything promised a glorious issue; Naples alone, weakly defended by German lansquenets and Spaniards, remained still to be vanquished. The siege was opened on the 1st of May, 1528, and the general confidently pledged his honor for the conquest of this strong city, which had once been so destructive to the French. It was easy with an army of 30,000 veteran warriors to overpower the imperialists; and a small body of English seemed to have come merely to partake in the festivals after the expected victory. The city, too, suffered from a scarcity, for it was blockaded by Doria with his Genoese galleys; and water, fit to drink, failed after Lautrec had turned off the aqueducts of Poggioreale; so that the plague, which had never entirely ceased among the Germans since the sacking of Rome, began to spread. Ere long, however, pestilence began to rage among the troops. * * * The great mortality did not commence until about the 15th of July, but so dreadful were its ravages, that about three weeks were sufficient to complete the almost entire destruction of the army. * * * Thousands perished without help, either in a state of stupor, or in the raving delirium of fever. In the intrenchments, in the tents, and wherever death had overtaken his victims, there these unburied corpses lay. * * * There was no longer any thought of order or military discipline, and many of the commanders and captains were either themselves sick, or had fled to the neighboring towns in order to avoid the contagion. The consequence was

that within the space of seven weeks, out of the whole host, which up to that period had been eager for combat, a mere handful remained, consisting of a few thousands of cadaverous figures, who were almost incapable of bearing arms or of following the commands of their sick leaders. On the 29th of August the siege was raised. Fifteen days after the heroic Lautrec, bowed down by chagrin and disease, had resigned his breath, the wreck of the army retreated amid thunder and rain, and was soon captured by the imperialists, so that but few of them ever saw their native land again. This siege brought still greater misery upon France than even the fatal battle of Pavia, for about 5000 of the French nobility, some from the most distinguished families, had perished under the walls of Naples. Its remoter consequences, too, were humiliating to the king and the people, since owing to its failure, all those hitherto feasible schemes were blighted, which had for their object the establishment of French dominion beyond the Alps."¹⁹

Typhus raged during the whole of the Thirty Years' War (1619-1648) and "in 1620 the Bavarian army lost in a few months in Bohemia not less than 20,000 men. * * * In 1628 and 1632 the Swedish army under Gustavus Adolphus carried typhus into Northern Germany and the population was so destroyed that fifty years later villages were left without inhabitants."²⁰ "The wars of Louis XIV. were always followed by this disease and the losses of the French army were enormous."²¹

It was one of the destroying factors in the mortality of our troops during the Revolution, probably introduced by English troop-ships.

Both typhus and dysentery were preëminently destructive during the Napoleonic wars. "In 1799-1800 an epidemic occurred at Genoa when the garrison was besieged by the French, and half famished, and the French army during their retreat from Italy communicated fever to fifteen towns and villages where they halted en route."²²

In an epidemic in Saragossa, which at the time of the siege contained probably more than 100,000 people, 15,000 of its defenders succumbed to disease, while the population died unheeded, as 54,000 out of the 100,000 perished. Thiers says: "Nothing in modern history had resembled this siege, and only in two or three instances, such as Numantia Saguntum or Jerusalem, did the records of history present similar scenes. Nay, the horror of the modern siege surpassed that of its antique parallel, by all the might of all the means devised by science."²³

In May, 1812, the Bavarian army serving among the French numbered 28,000 men; in February, 1813, there were only 2250 men under arms. The great destroyer was typhus. In August,

1813, the first Prussian army consisted of 37,728 fighting men—having lost 16,000 by the sword, and 10,000 by disease—almost entirely typhus. In Mayence alone, of 60,000 French troops composing the garrison in 1813-14, there died of typhus in six months 25,000 men²⁴; in Dantzic three-fourths of the garrison died of typhus, and thousands of the French troops, stricken by both frost and famine, perished from typhus during the retreat from Moscow.

The complex causes of death in the Crimean war, and which, from the misadventures of that campaign, can never be perfectly elucidated, were primarily due to the fact that the armies had been weakened during their stay near Varna, by diarrhœal diseases with also cholera,* where they were likewise exposed to and deeply tainted with malaria.

Shortly after landing in the Crimea, they were compelled to undergo, on insufficient rations, very great fatigue, which in their weakened condition they were hardly prepared for: "As 596 men sank during the famous flank march, and 2237 were sent off sick, therefrom to Scutari;"—without tents or knapsacks for weeks, and immediately engaged in the siege, the troops melted away from various diseases, the types of which were so intermingled or fused together, that it was impossible perfectly to differentiate them.

Then followed the horrors of that memorable winter, which were borne with such heroic endurance as to win the admiration of the world, mingled with pity and wrath at the existence of so much preventable suffering. Tainted with malaria, poisoned with scurvy, and with a large sick list from typhoid and typhus, the mortality rose from the 10 per cent. anticipated, to 45 per cent. in some corps and to 73 per cent. in others.

PLAGUE.—The most mortal of all contagious diseases, and which was the scourge of the world for centuries,—is preëminently a disease due to filth, in which its supposed bacterial cause finds its appropriate culture medium.

Primarily the endemic of Egypt, its course was westward along the Mediterranean Sea, involving Lybia and the northern coast of Africa; and also through Asia Minor, Syria, Turkey in Asia and Turkey in Europe, to Europe proper. But, though originally a disease of hot climates, it is not in itself a malady of

* The total number of cases of cholera during the war was—English forces 7575, deaths, 4513; French forces 12,258 cases, 6013 deaths.

the tropics, for even in Egypt, its native habitat, it never raged south of Assoun.

Diagnosticated as a distinct disease whose area was Egyptian as early as the end of the second, or the beginning of the third century before Christ, it was confined to its proper habitat until the time of Justinian (A. D. 527-65) when it commenced its westward course, and from that time on, waves of death succeeded one another, so rapidly and constantly that it has been estimated that during the cycles of epidemics of this disease, in Europe alone, one-fourth of the population, or 25,000,000 people, died of either the Levantine or Oriental plague, or its congener, the Black Death, which was introduced from China, by the caravan routes to the Caspian and Black Seas, to Constantinople and thence to Europe, some time in the fourteenth century.

During the Crusades, which offer so many problems of interest alike to the physician, the theologian, and the sociologist, the rude levies,—whose allegiance was due primarily to their feudal chiefs, and to a central controlling authority only secondarily,—transported to an unhealthy climate, and through sheer ignorance, contempt and neglect, destitute of both transport, shelter, food and medical aid,—suffered inconceivably from famine and the ravages of various diseases, including plague, which invaded camps not singly, but simultaneously or in rapid succession.

The same phenomena of death from famine or plague, rather than from the ordinary casualties of war, follow each other in melancholy sequence through all these expeditions.

The first crusade was preceded by Peter the Hermit, who led a multitude of men, women and children, estimated at 200,000, only 7000 of whom ever reached Constantinople, near which place they were soon after exterminated. The main body brought its long campaign to a successful issue after desperate losses from disease, famine and the sword, at Nice, Dorylæum, and Antioch (where alone 50,000 perished from pestilence) by the final capture of the Holy City, the surrender of which, however, was signalized by a massacre which would have disgraced and appalled even savages.

One of the most striking and characteristic episodes of the second crusade, when the Latin kingdom of Jerusalem passed away, was the frightful mania called the children's crusade, in which 50,000 children either perished en route to Palestine, or disappeared forever in the slave marts of the Orient.

In the third,—fever, thirst and famine, were more potent in causing the defeat of Richard Coeur-de-Lion than the arms of Saladin.

The fifth, though its object was left unaccomplished, was memorable for the siege, the capture, and the sack of Constantinople, and gave to literature the imperishable chronicle of the Conquest of Constantinople by Ville-Hardouin.

In the eighth, led by Louis IV. and chronicled by De Joinville, scurvy and starvation were the main factors, and in the ninth, again led by St. Louis, an outbreak of plague caused his death among many others, near the historic site of Carthage. "Thus" as Voltaire, quoted by Gibbon, wrote, "a Christian king died near the ruins of Carthage, waging war against the sectaries of Mahomet, in a land to which Dido had introduced the deities of Syria."

LEPROSY.—Another disease which ravaged Europe during the same epochs conjointly with the plague,—was so prevalent that all ranks of society were tainted alike, and the description of Death in Horace could well be applied to it.

"—Aequo pulsat pede pauperum tabernas
Regumque turres."

It, however, between the twelfth and fifteenth centuries, underwent considerable vicissitudes, becoming at times more prevalent and then again being much less common. These changes probably corresponded with alternating periods of want and prosperity, the disease becoming general when the vitality of the nation was lowered by long wars, pestilences and famine. The extraordinary spread of the disease at the time of the crusades led to the belief that it had again been imported into Europe from the East, and Voltaire characteristically says that this was the only permanent result achieved by these expeditions. There is however, abundant proof that, even if leprosy was reimported, it had really never left Europe. In the early part of the sixteenth century the scourge suddenly began to abate, and in a relatively short time it became nearly extinct in most of the countries in Europe—though there were a few strongholds from which leprosy has never been driven.²⁵

Plague also, after the seventeenth century (forty-five distinct epidemics were recorded in that one century) gradually diminished in virulence, contracted its area, and finally disappeared

from Europe. But during its continuance, its ravages were so universal that its appearance in armies sank into insignificance.

When Richmond invaded England in his campaign for a kingdom, his army was composed of wandering freebooters, vile landsknechte as they were called in Germany, who assembled under his banner at Havre, sharpshooters formed under Louis XI., who recklessly pillaged Normandy, and whom Charles VIII. gladly made over to Henry, in order to free his own peaceful territories from so great a scourge. This army may not have been worse than others of the same period; but, cooped up as they were for a whole week in dirty ships, they carried with them all the material for germinating the seeds of a pestilential disorder, (the sweating sickness) which broke out soon after on the banks of the Severn and in the camp at Lichfield.²⁶ Attacked by this disease but few of the victors of Bosworth Field lived to see Henry crowned.

It increased the horrors of the awful siege of Leyden which is familiar to all readers of Motley; the soldiers of Cromwell died of plague as well as from typhus; the French and English alike died of it during the first occupation of Egypt; while even so late as this century, an epidemic occurred during the Russian campaign against Turkey, 1828-29, as described by Von Moltke in his history of that campaign.

In 1877-78, at the close of the Russo-Turkish War, when the Russians were in camp in sight of Constantinople waiting the ratification of the treaty of peace, Greene states in his "Army Life in Russia": that "Every variety of camp fever broke out, from the mild forms of malarial fever, through the typhoids to the typhus, and finally the typhus with spots, which is not greatly different from the plague. They spread so rapidly that throughout the months of May and June fully one-half of the Russian force near Constantinople lay on their backs; so many doctors and nurses died that it was not unusual for one surgeon to have a thousand patients dependent upon him—so large a number that for sheer lack of time, the lighter cases could not be visited more than once in three or four days * * * during these three months over 30,000 sick had been transported to Odessa. * * * some of the Cossacks who returned to the Caucasus carried the seeds of the disease with them. Inflamed by local causes it broke out with great malignity the next spring as the plague, whose

ravages in Southeastern Russia during the summer of 1879 is well known."

DYSENTERY,—which still bears the name bestowed upon it by Hippocrates,—has always been one of the most fatal scourges of armies.* From the dawn of history to the fall of the Second Empire at Sedan, its presence among troops has been noted. It made, in conjunction with plague and famine, frightful ravages in the army of Xerxes, when the invasion of Greece (B. C. 480) had ended in disaster. From that time on, through the formative stage of Europe,—from the invasion of Italy by Theodebert, king of the Franks, A.D. 538) when one-third of his army died of dysentery, compelling his retreat; to Agincourt, when Henry V. lost one-fourth of all his forces from it,—through all public and private wars and the miseries of the crusades, hardly an army escaped this pestilence.²⁷

For, as summarized by Aitken, it "has followed the track of all the great armies which have traversed Europe during the Continental wars of the past two hundred years. It helped to destroy the British army in Holland in 1748. It decimated the French, Prussian and Austrian armies in 1792. It was a chief cause of death in the ill-fated Walcheren expedition in 1809. It cut down the garrison of Mantua in 1811 and 1812. Sir James McGrigor records how fatal the disease was in the Peninsular campaign, and we know how disastrous it was to our troops during the first winter they passed in the Crimea in 1854. In the words of Sir Ranald Martin it is the disease of the famished garrisons of besieged towns, of barren encampments, and of fleets navigating tropical seas."

Properly a disease of the tropics, where it is both endemic and epidemic, it extends from 35 to 40 north and south latitude in a broad belt which comprises India, Asia, America and southern Europe. In India it attacks every fourth man, and in some stations every second man; in South America its mortality ranges from 60 to 80 per cent., and in Egypt, Napoleon lost more men from dysentery than from the plague.²⁸

* Although the subject is yet *sub judice*, still there is reason to believe that dysentery with its sequela of hepatic abscess, is caused by the presence in the bowel of the *Amoeba coli*; the disease as thus developed, has been studied at St. Petersburg, India, Egypt and in this country with gratifying results.

Vide Bulletin Johns Hopkins Hospital, Vol. 1., 1890; and Boston Medical and Surgical Journal, Dec. 3, 1891.

When epidemic occurs in armies, it is without doubt contagious, *per se*, and this observation made by Pringle has been confirmed by the *experimentum crucis* so often, that it may be accepted as proved.²⁹

Military surgeons have also noticed that it was more prevalent in [situations where malarial fevers exist; for instance,—after the battle of Dettingen in 1743, the English camped in a low wet place, and 500 cases of dysentery occurred in eight days; also in the Franco-Prussian war, epidemics of it broke out around Paris and Metz.³⁰

In our own country, it spared not the levies raised for the French war in 1756; in the Revolution it was present in the trenches in front of Boston, and was known throughout the war; in Mexico, it accompanied the Army of Invasion, as it did that of its successor, the French contingent of Maximilian; and in the War of the Rebellion it caused a mortality of 12.36 per thousand.

CHOLERA.—Is the pure endemic of India, and has raged among the European troops there since their first occupation of the country, for “the mouths of the Ganges and the Brahmaputra are to-day, as they have been from time immemorial, the centres of departure of the great Indian epidemics.”³¹

In 1781 Colonel Pears, commanding a division of 5000 men, lost in one day 500 men from cholera. The first world-famous epidemic dates from 1817, and during that year an army encamped on the Sind lost in a short time 764 European officers and men, and 8000 sepoys.³²

In 1818 General Hastings, then encamped between Calcutta and Bombay, lost 9000 men; the onset of the disease was so sudden that sentries fell as if struck by lightning, and it took three or four men to stand a tour of two hours.* * * In 1821 cholera made such ravages in the Persian and Turkish armies that they were obliged to put an end to warlike operations in Mesopotamia, and the armies imported the disease to their native countries.³³

Since 1830–32 when it invaded and slowly progressed through Europe, all armies have suffered, alike with the civil population, in every epidemic. In 1832, when the disease had reached America by way of the St. Lawrence, it continued West along the Great Lakes until in September it reached our military posts on the upper Mississippi. Fort Dearborn (now Chicago) was temporarily reoccupied in 1832, and it was here that epidemic cholera displayed its most fatal effects among our troops. Out of 1000

men, over 200 cases were admitted into hospital in the course of seven or eight days. * * * When these troops again marched for the Mississippi they appeared in perfect health, yet the cholera broke out again on the way, and when the command reached the Mississippi it had been as fatal as it had been at Fort Dearborn.³⁴

In 1866, during the Austro-German war, more men were lost by cholera than from the casualties of war, as 6427 died of cholera, and only 4450 were killed or wounded.³⁵ In the same year, 1866, cholera was distributed through our army from two centres of infection,—Governor's Island, N. Y. H., and Newport Barracks, Ky.,—resulting in 2813 cases, with 1269 deaths.³⁶ In the succeeding year, 1867, there was a less severe outbreak at various posts with 504 cases and 230 deaths among white and colored soldiers.³⁷

YELLOW FEVER.—Caused without doubt by a germ which has not yet been isolated, is a disease which affects more particularly the white races.

It originated in the Antilles, and may have been brought back to Europe by Columbus, who lost in 1493 a large number of his men at San Domingo of what is supposed to have been yellow fever. On his return, an epidemic broke out in Barcelona.³⁸

The disease is an endemic of the West Indies, parts of South America and Mexico, and the west coast of Africa; as an epidemic, it has raged in the western hemisphere from 42° north latitude to 33° south latitude, and in the eastern hemisphere from 42° north latitude to 8° south latitude, affecting Spain, Portugal, France and Italy. Its relation to elevation is peculiar. In Jamaica and San Domingo the hills are free from it; in Mexico it has never assumed an epidemic form at an elevation above 4000 feet, while in South America it has been frightfully fatal at an elevation of 14,000 feet.³⁹ All bodies of troops engaged in expeditions in its focal area, have suffered more or less severely from it.

In the ill-fated expedition to Carthagená under Admiral Vernon in 1740, its ravages were most disastrous, and are described by Smollett, who was present in the fleet as a medical officer, in his novel of *Roderick Random*.*

* That the enormous mortality of English troops serving in the West Indies was due in great measure to the most frightful ignorance and disregard of the common

Talleyrand says the endemic diseases of the West Indies resulted "in sacrificing all that was left of the splendid army of Egypt, in the vain hope of reconquering San Domingo."⁴⁰

The epidemic of it in this country in 1793 is vividly described by Charles Brockden Brown, the first American who obtained European recognition as an author, in his novel *Arthur Mervyn*.

Our troops suffered from it in the Mexican War, and in the French expedition to the same country "the fever broke out among the troops six days after landing in Vera Cruz, and it also attacked the fleet."⁴¹ During our Civil War there were among our troops 1301 cases with 436 deaths.

In 1867 it was introduced into the United States from Vera Cruz, Mexico and Havana, and many of the garrisons stationed at southern posts,—Galveston, Jackson Barracks, Fort Jefferson, etc.,—suffered, as there were among the troops 1520 cases with 453 deaths.⁴²

SMALLPOX was originally introduced from India or China, slowly followed the then scanty and imperfect lines of travel, and was known as early as the sixth century. During the Crusades the disease had become so universally spread over Europe that special smallpox houses were erected for the reception of such cases. A recent writer on medicine⁴³ says if a modern traveller could be transported to the streets of London as they appeared in the early part of the present century, it is probable that no peculiarity of architecture, dress, or behavior, would be to him so strikingly conspicuous as the enormous number of pock-marked visages he would encounter at every turn. For centuries it was sense laws of hygiene, has been shown most conclusively and recently by Brigade Surgeon Maunsell in the *Medico-Military History of Jamaica*.

The diseases to which the men fell victims were malarial and yellow fevers, dysentery and cholera.

Dr. Maunsell, in searching the records from 1655, states that the men died at an average rate of 1.40 a week, and that in some years later, out of 800 who landed, two-thirds died in a fortnight. From 1817 to 1836 statistics show that every man in the force was twice in hospital annually; that 121 out of 1000 died annually; that of these deaths no less than 101.9 were caused by fever and 20 from other causes, * * * in Tobago where the barracks were the best * * * the men had only 250 cubic feet per man, * * * they slept in hammocks packed as closely as possible; each man had a space of only 22.23 inches in breadth, * * * during the ten years ending 1889 the mortality from all causes was only 11.36 per 1000, for fevers 4.30 per 1000 in Jamaica.

London Lancet, June 20, 1891.

The diminished rate of mortality is directly attributable to increase in pure air space, greater cleanliness, improved dietary, with the usual result of less intemperance.

so universal that no special reference need be made to it as a scourge of armies, except that in the Revolution one cause of the failure in Canada may be ascribed to it, as it raged there with great violence, many of the men and the general in command having died of it.⁴⁴

In our Civil War there were, among white and colored troops, 18,952 cases, with 7058 deaths; and in Lee's Army of Northern Virginia, from October, 1862, to January, 1864, 2513 cases, with 1020 deaths.⁴⁵

In the Franco-Prussian war the mortality from small-pox in the army of Paris was 6.76 in 100, but the German army, which had been carefully vaccinated and re-vaccinated, lost during the whole campaign but 216 men from small-pox, out of an effective of 913,967 men.⁴⁶

SCURVY, which has no geographical boundary, has been more peculiarly a disease of lonely ships imprisoned in ice, or of exploring vessels sailing over unknown seas; and, on land, one of besieged towns or fortresses. It was particularly the scourge of the early voyagers, Vasco da Gama, Cartier and others. Anson's famous voyage of circumnavigation (during which 380 men out of 510 died of scurvy), together with the long series of Arctic explorations, furnish many dreadful histories of suffering and death from it. In armies, it ravaged the forces of Germanicus in his expedition (A. D. 14) to avenge the insult offered to the Roman eagles by the destruction of Varus. His campaign was successful, but the troops suffered greatly from an affection supposed to have been scurvy, and which was benefited by certain herbs pointed out by their barbarous allies.⁴⁷

De Joinville describes fully the malignant epidemic in the army of St. Louis, in his rugged old French, thus,* "The flesh on our shanks dried up or withered away, and the skin over our shanks became spotted with black spots and earthy in color, like an old boot; and the gums of those who had the disease rotted; none who had the sickness recovered, but died; the sign of death was this, when the nose bled, death was inevitable."

* The original old French is added for those interested in the subject, "que la charr de nos jambes sechoit toute, et li cuirs de nos jambes devenoit taveles de noir et de terre, aussi comme une vieille heuse; et a nous qui aviens tel maladie, venoit pourrie es gencives; ne nulz ne eschapoit de celle maladie, que mourir ne len couvenist. Lis signes de la mort estoit teix que la ou li nez seignoit, il couvenoit mourir."

"At Breda, during the siege by Spanish troops in 1625, 1608 soldiers were attacked * * * at Thorn in 1703, during the Swedish siege, 6000 died of scurvy."⁴⁸

There are many instances of the disease recorded in the early history of our army, and one of the most typical is described by Surgeon General Wales, U. S. Navy, who states (in the *International Encyclopædia of Surgery*) that Dr. Gales reported the sufferings of the American troops in 1820, in their march to Council Bluffs, which place was reached in October after weeks of the greatest hardship in navigating the boats up the Missouri River, * * * with food consisting chiefly of salted or smoke-dried meats, without vegetables or groceries of any kind. In the following January scorbutic cases began to show themselves, but the disease proved fatal to few until February, when nearly the whole regiment sank away under its influence, and it continued unabated until April, when wild vegetables appeared. The strength of this post and that of St. Peter's was 1016; the number of cases was 516; and the number of deaths was 168.

In all of the European wars it has been a depressing element or taint always. In the Crimea 23,250 French entered hospital for scurvy alone, and 17,572 English; the Sardinian contingent suffered proportionally, and the original force of Omar Pasha was literally destroyed by the same disease.

Our own army was, notwithstanding the most strenuous efforts, so far from being free from it, that there were 30,714 cases recorded during the Civil War.⁴⁹

The principal diseases which have affected armies epidemically have now been mentioned as succinctly as possible, and though these illustrative examples are far from exhaustive, yet it may be thought that they have been exhibited at a too wearying length; but the subject is interesting and important, and it is well not only to appreciate the dictum that history repeats itself, but also occasionally to show in what manner the repetition occurs.

The primitive conception of the Greek poet that Mars was always accompanied by Pestilence and Famine, was no vain figment of the imagination, but a recognition of the truth that Pestilence invariably has been and probably always will be, the concomitant or the sequel of War.*

* The authorities from which the preceding paper has been mainly derived are given on the following page.

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POST SCHOOLS IN THE ARMY.

By LIEUT. JOHN L. SEHON, 20TH U. S. INFANTRY.

THE attention given to the subject of the education of the individual soldier has, of late, been far more general than at any time since the enactment in 1866 of the statute providing for the establishing of post schools in the army.

When this became, by order of the War Department, a compulsory duty, there is little doubt but that the requirement was generally received with bad grace by the line of the army.

It is true, that by many military commanders of high rank who were not daily brought into close personal relations with the enlisted man, the idea of a post school was generally approved; but by many company and post commanders it was viewed as a measure which in reality accomplished but little, while it interfered very materially with the work necessarily performed by the labor of enlisted men. So, from year to year, post schools were carried on at many garrisons in a most perfunctory manner, merely in obedience to the letter of the law, that sufficient instruction be imparted and adequate data obtained upon which to base the annual report.

In the early years of the post school this indifferent manner of receiving and treating the subject of the education of the soldier, while not to be commended or even condoned, was readily understood to be the result of incessant labor in garrison and continuous campaigning in the field.

The opinions entertained by officers in general as to the necessity, advisability, practicability, scope and methods of instruction, are widely different and often original to a curious degree. I refer not only to the recorded official opinions of those called upon to conduct these schools, but also to the general impression that existed among regimental and company officers. I mention this as illustrative of the fact, that long after the creation of the post school, it was quite commonly denied by many efficient officers, that there was any necessity for its existence. In fact, it is only within a very recent period that the subject of post

schools has received that serious attention that it should have commanded years ago.

Why has this sentiment and opinion of indifference to the education of the soldier lasted a decade longer than the exigencies of the service seem to have demanded? It is because the post school, stunted in growth and dwarfed in size, has been unable to perform the duty which has from time to time devolved upon it.

Objects of the Post School.—To-day we have as the general objects of our post schools the following, named in the order to which it appears the greatest weight is given.

1. To give all men in the ranks of the army an opportunity to acquire a primary education, which they may have previously been denied, or may have refused to obtain in civil life.

2. To afford the children of officers and enlisted men an opportunity to obtain at their stations the rudiments of an education, with the least expense to their parents.

3. To educate the soldier, so as to produce efficient non-commissioned officers, as well as trained and intelligent privates.

Under the third head I include all minor reasons that bear upon the discipline or conduct of the soldier in the service; under the first all those that may be believed to affect him upon his return to civil life.

To accomplish all of these ends, the present school is entirely inadequate. The requirements are too great and the elements composing the school are more or less irreconcilable. The establishment of a well-organized system, giving to each principal department the recognition and weight its importance demands, is at once required.

School Teachers.—There seems to be a very general feeling and belief that we are not provided with proficient instructors. They should not only possess the necessary knowledge, but should know how to impart it to their classes; and the absence of these qualifications is, in many instances, the result of an improper mode of selection. Too often the teacher has been detailed as such in order to give him compensation for other work performed; as, for instance, the clerical work of the adjutant's office, for which no pay can otherwise be obtained. Such a clerk recognizes the subterfuge, and if he exerts himself as school teacher to his fullest ability, he is the exception and not the rule.

One recent author upon this subject strongly advocates the enlistment of special men, and their maintenance as a non-combatant corps,—a distinct branch of our army organization. More satisfactory results would probably be gained, however, by employing civilian school teachers, than by further burdening the army with non-combatant members. Would it not be inappropriate to clothe in uniform, and entrust with the control of men, a man who is utterly ignorant of the life and duties of the soldier, and who, since it is proposed to relieve him from military duties, will acquire military knowledge but slowly? Instead of assisting him and increasing his authority, would it not, on the contrary, tend to lessen the respect of the men for him, thereby greatly diminishing his control over them and the probability of interesting them in their work? If men were so enlisted, unless paid sufficiently well to obtain the very highest order of teachers, would there not be a tendency to relax in a performance of their duties if their positions were assured them for so long a period as a term of enlistment? With civilian teachers, employed as such, equally good, if not better men could be obtained, who would continue more in touch with that portion of the outside world engaged in similar work.

Such teachers should be employed by the chief quartermaster of the Department, upon the recommendation of the post commander, under a formal contract made annually. It should be stipulated therein that the contract could be annulled at any time, upon the recommendation of the post commander, for incompetence or for any serious misconduct.

Let the compensation be based upon the number of companies serving at the post, instead of upon the number of pupils; so as to prevent any attempt to draw into the school any "dead weight" for the sake of increasing the remuneration. These teachers should be allotted in such number to different military departments as the Secretary of War might deem necessary. If a post be abandoned, transfer the teacher to another, or pay him for the remaining portion of the school term and annul his contract.

For years we have had contract surgeons, and have employed civilian skilled mechanics in the Quartermaster's Department; why then should it not be practicable to have contract school teachers?

The necessary educational requirements for such teachers will become evident in the following discussion upon the organization

of the school, the composition of its classes, and the extent of the instruction to be given.

School for Children.—That we should have proper schools at all army posts, where the children of officers and enlisted men, as well as those of civilian employés, may receive what is termed a common school education, is undeniably true ; and such a school should be established and maintained entirely separate from the school for enlisted men. The true object of the post school is the education of the soldier, and this should not be lost sight of, nor made secondary to the education of officers' children. The inconsistencies and errors of many who are now urging the adoption of a universal system of schools for the services, are apparent here. The arguments they present are urged for the benefit of the enlisted man, but the plans they mature would secure a school better adapted for children.

It is not the intention of this article to suggest, or elaborate at length, a system for a school for children. Let the post chaplain, assisted by a civilian teacher as proposed, have sole and exclusive control and let it be known as the *Minor School*. For the sake of uniformity, and to insure the greatest progress, the manner, scope, extent, and school term, with each particular textbook, should be prescribed from the Adjutant-General's office, and should not be subject to change without good cause.

All pupils should be required to purchase their own books and other articles of personal use. Attendance at school of children in the garrison should in no way be compulsory upon their parents. Upon the satisfactory completion of a course, the pupil should receive a certificate, signed by the teacher and chaplain, or other officer in charge, declaring his proficiency in the studies prescribed for that course. If the entire course is not mastered, or in case of removal from the garrison before the course is completed, the certificate should set forth the particular studies in which the pupil is proficient.

School for Enlisted Men.—The policy of seeking to educate men while in the army, with a view to the betterment of their position amongst the ranks of bread-winners after their return to civil life, is more particularly a social problem ; yet as it may very materially affect the contentment of the soldier, and thereby increase his efficiency while in the service, it is also of interest from a military standpoint. That the idea is humane is most true ; that it is profitable to the army is uncertain.

In Continental armies, wherein service for a stated period is compulsory upon all male citizens within certain limits of age, it would naturally follow that the State should continue the education of its young men during their enforced military life. Would it not be unwise for the State not to do so? And would not its people resent the forcing of their sons into the army, to the interruption of their education, and subsequently returning them to civil life unfitted for the study of a profession, and, in many cases, even unqualified to take up a trade?

But in our country is this necessary?

With a population of over 60,000,000 of people, 6,000,000 of whom are men possessing the essential requirements for service in the ranks, can we not have 25,000 soldiers who do not need this elementary education, and whom we may train and instruct solely in duties, the benefit of which to them would be most apparent only in war?

If it be a question of extending greater educational facilities to our people, then let the Federal Government assist more materially the different State schools and universities, and give directly to the people what may be required; but do not burden the army with an expense, or a duty, which, carried beyond a certain limit, not only impedes the performance of military duties proper, but greatly restricts the military instruction and training which ought to be given the enlisted man. The entire elimination of the present post school is not desired, but it certainly is a feature of our service for which sentiment, not common-sense or any practical necessity, is largely responsible.

Some reasons still exist for its continuance, but it should be placed upon a totally different basis. Instead of making instruction, in what are known as the English branches, compulsory, it should be wholly optional upon the soldier's part. It is true that much latitude is now left company commanders in this respect, but this is not sufficient.

I had occasion recently to examine the lists of men designated to attend the post school, which were submitted from two organizations serving together. One company sent four men, the other twenty-eight; and, as far as I could discern, there was very little difference in the average intelligence of these two companies.

Then why this disparity? One captain recommended only those desirous of receiving the instruction, the other understood that the army regulations required all men in their first enlistment

to attend the school. What was the result? Three-fourths of this large company representation in the school sought every opportunity, every excuse, to escape a duty made doubly distasteful to them. And does any one for a moment doubt but that such a large amount of dead material was an absolute and positive injury to the school, an annoyance to the instructor, a hindrance to those earnestly seeking knowledge?

I cannot deny that in the past much good has resulted in certain instances from compelling illiterate men and soldiers of foreign nativity to attend the post school; but now we very rarely encounter an illiterate man in the ranks; and if enlistment in time of peace were denied to all foreigners not possessing a fair reading and writing knowledge of the English language, there should be no occasion whatever for a soldier to receive compulsory instruction in this department of the school.

The grammar department of the school for enlisted men, the one of which I am now writing, should not in any way interfere with any ordinary post duty. The school teacher alone, if a soldier, should be excused from guard and fatigue, but from nothing else. To excuse men undergoing instruction at their own desire from drills, parades, etc., is bad enough; but to relieve them from fatigue and stable duty is a very great imposition upon the other men of the company.

In brief, the students in this department should be limited to those men, who, in addition to their other duties, elect to take the course, which course should consist of those academical studies upon which they must pass an examination to obtain a commission. It is not to be inferred that every man who completes this course should have the privilege of being examined for a commission, but that every non-commissioned officer should, preferably, have taken the course before being recommended for a commission.

Nor should a man, desiring to become a student, be compelled to take the entire course. On the contrary, in respect to this school every man should be a free agent,—free to choose whether he shall pursue any, one, or all, of the studies of its curriculum.

A commissioned officer of the line, assisted by a civilian instructor, should have charge of this school, which should be known as the *Grammar School*,—wherein should be made a thorough study of grammar, geography, history, arithmetic, algebra, plane

geometry, plane trigonometry and the elements of surveying, as also of constitutional and international law.

The text books should be prescribed from the Adjutant-General's office, and should be the same as those used by an examining board in preparing questions for an enlisted candidate appearing for a commission. All students should supply themselves with their personal text books. A certificate of proficiency similar to the one given in the school for children, should be given each graduate of the grammar school.

As this course is quite comprehensive, and is one which would require a number of terms to complete, examinations should be held for each class within ten days of the completion of the study of any one subject, and a record of the results kept in the school, so that in case of discharge, transfer, or any other cause of failure to complete the entire course, a certificate enumerating the particular studies in which the student has proved himself proficient, can at any time be easily prepared. From such a school would issue a body of men, who, with their military training, would constitute in war an excellent class of volunteer officers, and in peace be indebted to the service for an education which must increase their probable chances of success in civil life.

To Educate Men so as to Produce Efficient Non-Commissioned Officers, as well as Trained and Intelligent Privates.

This aim of the post school has, in all discussions coming to my notice on the subject, been considered rather as one of the results to be expected from the development of its other features, than as a stated outlined reason for the support of our army schools.

Webster defines the word "school" as meaning "a place of discipline and instruction." In the army, then, should not a school be primarily a place of discipline and instruction in military knowledge?

No matter how profound the state of peace, war may soon again exist, and we must maintain at least a small standing army for instantaneous use when necessary; but, as the American people refuse to regard war as a probability, it is now generally considered that the principal occupation of the army is to form a training school for the nation.

The suddenness with which war may be precipitated, and the rapidity with which decisive results may now be attained, are

reasons, more imperative than ever, that military instruction should be thorough and suited to the present conditions of war. This instruction should be exact, well arranged, and alike in all companies of the same arm of the service, in order that the military knowledge disseminated among the people should be as uniform and complete as possible, so as to facilitate to the greatest degree the organization of efficient volunteer forces.

Since the Civil War special schools of instruction and application for cavalry, artillery and infantry, have been established, where our young officers may secure excellent training in their respective arms of the service. This, with the application to the line of the requirement of examination for promotion, and the still more recent creation of lyceums for officers at all posts, ensures that our commissioned officers will be as fully equipped for any conflict that may occur in the near future, as could possibly be expected in the absence of any experience in actual war.

But our present body of officers is not large enough to provide the number that will be required, and for supplying the deficiency, great dependence must be placed upon those who have served in the ranks of the army. Is there any school, or even any organized manner, in which our non-commissioned officers, as a class, are receiving the military education to qualify them to fill the positions that may then be given them? With the exception of the Artillery School at Fort Monroe, I am not aware of such a place. Excluding the drill-ground, their opportunity for regularly receiving this education is confined to our present non-commissioned officers' schools and summer practice marches.

Our company non-commissioned officers' schools are not at all adequate. Even in the same regiment they differ widely, and instruction in anything other than drill regulations, manual of guard, and firing regulations, is rarely undertaken. A proper school would be one in which correct and practical instruction would be given in all details of the duties which directly concern a company, and which a volunteer company officer must know.

The time occupied by a practice march is too brief to undertake more than a part of the practical work, and the occasion is wholly unsuited to impart any theoretical instruction ; moreover, the summer practice march is not the place for instruction in field duties, but rather for a practical examination as to how thoroughly the men have previously learned them. This practical instruction should take the place of the present instruction in

the English branches in the compulsory official school, and should constitute a *Service Course*, which all line non-commissioned officers, including lance corporals, should be required to take.

A line officer of rank should be in charge of the *Service School*, and lieutenants regularly detailed as instructors. The length of the term should be about four consecutive months in each year, and all studies in one general department should be completed before taking up any study in another department. That the same instruction may be given all students, and the greatest progress made in the time allowed, the same instructors should be assigned, as far as practicable, to studies classed in any one department, and the class should be divided into sections of from ten to twelve.

As the mass of our army must always be infantry, and as it is more than probable that we shall soon again have in the infantry the three battalion formation, similar to the other arms of the service, I will illustrate the principles and scope of the proposed service school by presenting a course of study prepared for an infantry battalion of four companies, commanded by a major.

With the present complement of non-commissioned officers for such a battalion, we would obtain a class of 36 students, divided into three sections. If the class be greatly reduced the number of sections should be reduced to two. The major will be in charge of the school.

All text books, papers, instruments and material required, should be furnished free to the students, and their attendance at school be compulsory as a strictly military duty.

The course of study prepared is best adapted for a division into four departments, namely:—1st, Administration. 2d, Drill Regulations and Manuals. 3d, Engineering. 4th. Science of War.

Two instructors will be required, one assigned to the departments of Administration and Drill Regulations, and the other to those of Engineering and Science of War.

The papers and records pertaining to the class work, which it will be necessary to retain, will, upon completion of the course of study in a department, be transferred by the instructor to the battalion adjutant. Instruction in the first month will be in the department of Administration, followed during the second month by study in the department of Drill Regulations and Manuals; the third and fourth months will be occupied with recitations and

practical exercises in the departments of Engineering and Science of War, in the order named ; of which the following is a brief description.

DEPARTMENT OF ADMINISTRATION.

Instruction in this department will consist in thoroughly explaining to the section the meaning and purport of all Articles of War, and those paragraphs of the army regulations especially bearing upon the welfare of the soldier. The manner of briefing communications, making out an official dispatch, vouchers for liquid coffee, and receipts for forage purchased in the field, will be shown. A complete set of a supposed company's books, papers and returns, with their proper vouchers, should be prepared and carefully explained by the instructor ; then blanks should be furnished the section, and each student be required to execute copies of them.

DEPARTMENT OF DRILL REGULATIONS AND MANUALS.

Instruction in this department will be given to the section in the authorized drill book, to include the school of the battalion, partly by recitation and partly by illustrating different movements by means of diagrams upon the black-board, particular attention being given to the duties of guides and non-commissioned officers in command of companies.

As the course thus prescribed is mainly to impress clearly the principles and explain any points that are susceptible of several interpretations, non-commissioned officers are also expected to continue their study of the drill regulations at all times. The pointing and aiming drills and the details of actual practice upon the rifle range, will then be shown, followed by a study of Kenon's Guard Manual.

DEPARTMENT OF ENGINEERING.

A lecture upon field engineering is given by the instructor, showing to the section the objects of field fortifications, thickness of materials used in them, and the distances at which they are proof against modern small arms ; and illustrating the construction of rifle pits and simple shelter trenches. Subsequently the section is required actually to construct the rifle pits, trenches, etc., described in the lecture.

A second lecture covering the making of gabions, fascines, hurdles, etc. ; the preparation of stockades, walls, roads and woods,

for defense; and the use of hasty demolitions, will be given; followed by practical exercises in actually constructing gabions, fascines, etc., and in demolishing banks of earth, representing walls, etc., with gun-cotton.

In military topography, included in this department, a brief lecture will be given explaining its nature and object, and teaching the construction of simple scales, and defining terms used in describing ground. The use of the prismatic and box compasses, the protractor, barometer and range-finder, will be described in this lecture; and, later, each student will be practised in their actual usage. This is followed by teaching the section how to draw the few conventional signs essential in the execution of a hasty sketch. These being understood, the section is exercised in mapping simple roads, etc., great care being taken to point out all errors in laying off bearings, taking distances from the scale, etc. In this department the instructor must exercise great care not to confuse his section by attempting too much, or requiring too great a fineness and neatness of execution in the maps and drawings.

Omit all theory where possible, and illustrate practically, using the exact dimensions. Especially should this be done in marking out tasks, and in preparing models for work in engineering; as where an exact representation of an object is made, men will then remember its appearance, size, shape and manner of construction, far better than if weeks be given to a merely theoretical study of the same subject. In this department particularly, if simple and condensed text books cannot be supplied, the instructor should prepare his lectures, notes giving dimensions, and drawings of the subjects he describes, so that they may be "hek-tographed," and each student given a copy.

DEPARTMENT OF SCIENCE OF WAR.

In this department is placed the study of the entire "*Extended order*" portion of the drill regulations (par. 502-621), as it is more clearly attached to a consideration of the other subjects of this department, than with those of the first department. As a thorough knowledge of battle tactics, and a complete familiarity with them—a familiarity that will cause men under circumstances of the most intense excitement to execute from force of habit the different movements when ordered—is of the highest importance, the instructor will habitually require the most accurate and pre-

cise recitations in all lessons in Extended Order. Subsequently come lessons in the following sub-heads taken from the drill book : Advance and Rear Guard (par. 636-645) ; Outposts (par. 646-650) ; Marches (par. 651-659) ; and Camping (par. 660-661), the same thoroughness in recitations being exacted as in lessons in Extended Order.

Following this theoretical instruction should come practical exercises in the work taught in the section room ; and where deployments are described as taking place at certain distances, or where particular local features demand certain formations, these distances and formations should be strictly complied with ; for we must bear in mind that we are conveying to men a knowledge which is to serve them as a mental pattern to be followed in actual service.

In the practical exercises of the Service School, where any detachment, company, or larger body of men, is necessary properly to exemplify the problem, the major will cause the battalion to be formed for that purpose. Upon these occasions the major will excuse any or all officers, or request their attendance, according to the conditions of the problem it is intended to illustrate.

As I have stated, the foregoing course of study has been arranged for a Service School in an infantry battalion of four companies. If a post be garrisoned by a different branch of the line, the course is to be modified by the substitution of the text books, cavalry or artillery, that particularly pertain to the arm of service of which the garrison is a part. If the garrison be a mixed command, the class will pursue its common studies together, and for the distinctive subjects will be divided into sections for the different arms. If the number in the class be greater than the number of non-commissioned officers now forming a complement for a four-company battalion, the number of instructors will be increased.

Upon a satisfactory completion of the course, to be determined by the result of the marks in the recitations, combined with those given for the practical work done, each student will be furnished with a certificate of proficiency, signed by the officer in charge and the instructors, to the effect that :

"Sergeant ———, Co. ——— Infantry, has completed the prescribed course of study, and is classed as proficient therein, at the Infantry Service School at Fort ——— for the year ———."

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Such a certificate is not to exempt a student from taking the

course the following year, but will be considered as his classification for professional knowledge for that year; in the same manner, in fact, as the certificate now given for proficiency in target practice.

In limiting the class of students to non-commissioned officers only, it might be said that the Service School could not educate all enlisted men, and that the privates have been overlooked; but such is not the case. That the Service School would not educate the non-commissioned officer and the private equally is true. Neither does any business, trade, or profession in civil life educate equally all who are engaged in it. There a man is instructed, drilled and trained, in exactly the duties that it is desired he should perform, and when he rises to the higher grades, it is because his capabilities have demanded it. So should it be in the ranks of the army. In the practical exercises in the Service School, the private would receive an exact instruction in the duties of his natural position. When his intelligence and efficiency secure his advancement to the grade of non-commissioned officer, his military education and training are continued.

No non-commissioned officer should be recommended for examination for a commission, unless he be a graduate of the Service School; and, when commissioned, he should be assigned to the arm of the service from which he has been promoted.

Each succeeding term should see the attentive and ambitious non-commissioned officer more and more thoroughly conversant with the Service Course, developing and sustaining yet more fully his fitness for his present grade in the army, so that when he passes out into civil life, he will be one of a class from which efficient volunteer officers may be obtained whenever their services may be required.

Comment and Criticism.

(The remarks under this head have, generally, been invited by the Publication Committee, which desires that, as far as practicable, these "Comments" should appear under authors' names.)

I.

"A United States Army."

Col. Thos. L. Livermore, Mass. V. M.

IT is not easy to find support for the position that the National Guard of the States is within the prohibition of the Constitution that no State shall without the consent of Congress "keep troops" in time of peace. This point was raised before the United States Supreme Court in the case of *Presser v. Illinois*, 116 U. S. 265, but the court did not find it necessary to decide it.

The militia which the colonies sent to the Indian and French wars, and which the States maintained before the adoption of the Constitution, like the National Guard of to-day, were supported, uniformed, equipped, armed and paid, when they were paid at all, by the colony or State, and they were sometimes, if not always, raised by volunteering. In the early case of *Houston v. Moore* (5 Wheaton), before the Supreme Court, Judge Washington drew a distinction between the "troops" which the Constitution contemplates and the State militia which were not forbidden. He said that the States "are expressly prohibited from keeping troops or ships of war in time of peace, and this undoubtedly upon the supposition that in such cases the militia would be *their natural and sufficient defense*," and it was held in this case that all the powers over the militia which the States had exercised before the Constitution was adopted, were reserved to them wherever not expressly given to and appropriated by Congress. The true distinction between such "troops" as the Constitution forbids and the militia which the colonies and States had always maintained would seem to be this. "Troops" would be organized bodies of soldiers whose whole service was due to the State, and whose only vocation was that of arms. Militia are organized bodies of citizens whose vocations are those of civil life, and whose military service is only occasional.

Article III of the Amendments to the Constitution is as follows: "A well regulated militia being necessary to the security of a free State the right of the people to keep and bear arms shall not be infringed." This is a provision in aid, not of the militia of the United States, but of the States; for, as was held in the case of *Presser v. Illinois* above cited, it is a restriction on the power of Congress, and in this view of it, this amendment is inconsistent with the theory that another part of the Constitution forbids the States to organize and arm their militia as they had done before the Constitution was adopted.

The question then occurs whether the National Guard is in contravention of any law of Congress. A ready answer in the negative as to many, if not all, of the organizations of the National Guard, is found in Sec. 1637 of the Revised Statutes, which pro-

vides that all corps of artillery, cavalry and infantry existing outside of the militia at the date of the enactment of the Statutes (1874), are to retain their preëxisting privileges, but otherwise are to be subject to the militia laws of the United States.

If there is any organization not included in this provision of the statute, there is reason to believe that it is not necessarily unlawful. The Constitution (Sec. 8) authorizes Congress only to provide for "organizing, arming and disciplining" the militia and for "governing" such part of it as shall be in the service of the United States. The right to appoint officers and train the militia, not in the service of the United States, is reserved to the States. Congress has exercised its power most sparingly. It has enacted that the discipline shall be that of the regular army, but has left it to the States to administer this discipline. It has enacted that officers and men shall be provided with a certain archaic armament but has left it to them or to their States to provide it,* and it has provided for organizing by enacting that the captains appointed by the States shall enroll all citizens between 18 and 45, with certain exceptions, and that they shall be organized into regiments, and into brigades and divisions as the States shall direct. No provision is made for the support, uniforming, equipping, training, or paying by the United States, and all this is therefore reserved to the States by implication of law, and imposed upon them by the necessities of the case. No method of enrollment is specified, and it may, therefore, consist in the mere compilation of a list of those citizens who are within the requisite age. This enrollment seems to be merely for the convenience of the authorities. It seems to be not the enrollment, but the law, which makes the citizen liable to the call of the President; but if it were the enrollment, the listing, such as it is, of that part of the citizens who enlist in the National Guard would be a sufficient compliance with the law to make them liable to the call of the President.

The fact that the regiments of the National Guard are not subject to the call of the President does not put them out of the pale of the law, because, curiously enough, the statute provides for two organizations into regiments, brigades and divisions. The first is for the purposes of training by the States. The second is to be made when the President calls out any portion of the militia. In that case he is to organize them anew into regiments, brigades and divisions. The National Guard conforms in all respects to that organization of the militia which the statute provides that the States shall establish, and unless the failure of the States to enroll and organize *all* the citizens liable to military duty renders the organizations into which they have formed those who are enrolled unlawful, it is not easy to find ground for holding them to be unlawful. Probably no court would hold that a partial performance of duty by the State was unlawful because it was not a performance of its whole duty.

But it is not essential to the end to which Lieutenant Batchelor directs his vigorous pen that his position regarding the constitutional and statutory question shall be unassailable. If the National Guard is within the Constitution and the law, it can be treated as he would treat the militia which he desires to see established; and it can be enlarged to the necessary dimensions. Two questions present themselves with reference to the wisdom of establishing an army of militia half a million strong. Is it expedient to establish an army of this size? and would the militia answer the purpose? It would be interesting to see from the same pen a computation of the strength which an invading army must have, to meet with anything less than destruction at the hands of our regular army and an improvised force of volunteers; and if the invading army were to come across the seas, what number of ships they would require and what pro-

* The Act of 1882 provides for furnishing to States on the coast which maintain permanent camp grounds, heavy guns and mortars, with a sum in cash for constructing batteries for them; and the Act of 1887 provides that arms, ordnance and quartermasters' stores and camp equipage to the value of \$400,000, shall be annually apportioned among other States maintaining one hundred active militia to each senator and representative.

vision of ammunition, stores, horses and cannon. It would require a great deal of argument in this line to convince the citizens of this country that we need to take precautions against an invasion by sea. Our neighbors on the north and south have no standing armies which we need to fear, but if we should establish a force of half a million soldiers, so trained, organized and armed as to be efficient in battle, we might alarm our neighbors into arming themselves and give them and ourselves more than a taste of the experience of the unhappy countries of Europe, which almost faint under the burden of their arms and yet do not dare to drop them.

The danger of attack by a foreign navy upon our lake frontier is one that can never be serious until the navigation of the St. Lawrence is greatly improved, and is it not as true on the lake front as on the coasts, that an army is not what is needed to defend against naval attacks, but rather fortifications and naval preparations?

No civilized nation would risk an army within our borders, or excite the subsequent vengeance of sixty-five million people for mere booty.

If in truth we need an army of half a million men prepared to take up arms at short notice and meet an invading foe in battle, would militia, with the training recommended by Lieutenant Batchelor, be an effective force? The experience with the militia in the War of 1812 and the Revolution was not encouraging. Some of the militia regiments served very well in making a show of armed force at critical times during the War of the Rebellion, but no one of them under the test of downright hard fighting ever proved that the training and discipline of peace had made it thoroughly reliable for such work. In civil conflicts they have sometimes proven themselves steadfast and reliable, and sometimes the reverse.

But the same men, who at times proved feeble, uncertain and timid, when summoned unexpectedly from their homes to serve in the ranks of the militia under fire or the missiles of mobs, would have been firm and valorous soldiers in a volunteer or regular regiment into which they had enlisted for the purpose of going under fire. The citizen who, on his way through the streets, would take shelter in the nearest doorway or vanish around a corner to escape the fire at large of a ruffian or lunatic, would, on the next day, if enlisted for war, walk forward in the face of a thousand men firing in his direction. It may be that the most of the militia do not in time of peace enlist with the idea that they may be called on to face fire, and that it does not therefore come easily to them in an emergency to leave their families and property and make up their minds that they have no right to measure their danger or think of safety. There are certain bodies of high spirited young men in the soldiery of the States with whom the point of honor is sufficient to make them face fire as unflinchingly as veterans, but there is no evidence that this would be the behavior of the militia in general. Whether Lieutenant Batchelor's scheme for making them soldiers of the United States would change their way of looking at their duty is an interesting question. It is hard to believe that the election of officers which he advocates could result in electing the best men. The almost inevitable result would be that the men who were most ingratiating or pliable would be elected, and not the men who were most intent upon discipline and soldiery, unless human nature should act differently in the exercise of the right of suffrage in the company and in other assemblies.

My own belief is that a volunteer regiment properly officered, in a month of drill and discipline, would be more effective than a regiment which had existed for years under the system proposed in the article under discussion, and to my mind the best provision for defense would be the education of a thousand cadets a year at West Point. These graduates, relegated to civil life, would give us a reserve corps of instructors and officers for volunteers in time of war, that would serve to create an army for us, more efficient than militia, and at much less expense.

Col. E. C. Brush, 1st Reg't Light Art'y, Ohio N. G.

The United States Militia laws of 1792 have never been repealed or in any essential way amended. They have, however, by general consent, been inoperative nearly ever since their passage. These laws provide that "every able bodied male citizen of the respective States, resident therein, who is of the age of eighteen years, and under the age of forty-five years, shall be enrolled in the militia." They also provide that every citizen shall, after his enrollment, "be constantly provided with a good musket or firelock, of a bore sufficient for balls of the eighteenth part of a pound, a sufficient bayonet and belt, two spare flints," etc., etc.

You will notice service in the militia is compulsory, and that eight millions of our citizens should be provided with flint-lock muskets.

In 1808 Congress made the annual appropriation for the militia two hundred thousand dollars. It so remained for seventy-eight years, when it was increased to four hundred thousand dollars, where it still remains. If the appropriation had been increased in ratio with the population, instead of four hundred thousand dollars it would now be two millions of dollars.

Whilst the General Government has done so little in the past one hundred years and practically remained at a standstill so far as militia legislation is concerned, most of the States and Territories, by State legislation, have provided the United States with the nucleus of a National Guard. The Government seems to have looked after the regular army and turned the militia over to the respective States.

These State troops are called by various names in different States. Massachusetts has her Volunteer Militia, Indiana, her Indiana Legion, Louisiana, her State National Guard, Kentucky, her State Guard, and so on. Twenty-seven States and Territories have, however, adopted the term National Guard. It is the one generally used in speaking of the organized militia.

The National Guard numbers about one hundred and six thousand officers and men. Infantry is, of course, the predominating arm. There are about seventeen hundred companies of infantry, one hundred batteries of artillery, many of which are two-gun organizations, and one hundred and twenty-five troops of cavalry, a majority of which are practically infantry.

The Guard equipment and efficiency depends almost entirely on the States. Some States are noted for their liberal appropriations for their troops, whilst others are noted for appropriating a starvation allowance.

The armament and uniform of these Guardsmen is not uniform, and if brought together would present a variegated appearance. The tendency now, and for several years, has been to adopt the regular service uniform with the exception of the buttons which bear the State seal. Take it all in all, the States have made a very creditable present to the General Government of one hundred and six thousand volunteer soldiers.

The National Guardsmen's millenium will have come when the General Government has uniformed, armed and equipped them all alike.

We evidently derive the name National Guard from our old friend in need, France. It is indelibly associated with some of the revolutions in that country. During the Revolution of 1790, Lafayette commanded the French Guard when it numbered three millions. The adoption of the name in this country is associated with his visit to our shores in 1824 and the famous Seventh New York Regiment. After Lafayette had reviewed the troops, turned out in his honor upon his arrival in New York, a group of officers belonging to the Eleventh New York Militia were talking over the event, when one of them remarked, "How I would like to command a regiment of National

Guards." This remark resulted in the Eleventh adopting the name. The Eleventh afterwards became the Seventh. New York State adopted the name in 1862 and Ohio early in 1864. In 1860, Clement L. Valandingham, during a speech in Congress, urged the changing of the militia laws and an increase of the appropriation. He reviewed the militia system and spoke of the volunteer system replacing it, asserting that these volunteers "would in time become the National Guard of America."

The National Guard may properly be defined as a volunteer force, supported almost entirely by the States, for their own and the country's service.

So much for the Guard,—now as to its relation to the General Government.

The following extracts from the Constitution establish the legal relation between the militia and the General Government.

"Congress shall have power to provide for calling forth the militia to execute the laws of the Union, suppress insurrections, and repel invasions."

"To provide for organizing, arming and disciplining the militia, and for governing such part of them as may be employed in the service of the United States, reserving to the States, respectively, the appointment of officers and the authority of training the militia according to the discipline prescribed by Congress."

"The President shall be Commander-in-Chief of * * * the militia of the several States, when called into the actual service of the United States."

"A well-regulated militia being necessary to the security of the State, the right of the people to keep and bear arms shall not be infringed."

In 1827 the Supreme Court of the United States by a unanimous vote decided "that the authority to decide whether the exigency has arisen (for calling on the militia) belongs exclusively to the President and that his decision is conclusive upon all other persons." "Nor is it necessary to set forth the orders of the President at large; it is sufficient to state that the call made by the governor of the State was in obedience to the orders of the President."

The foregoing plainly shows that the militia is subject to the call of the President of the United States and puts a quietus on the idea that a National Guardsman cannot be ordered into service outside his own State unless he volunteers to go.

The following extracts from the opinions of the Attorney-General throw more light on this subject: "The President is not obliged to take personally the command of the militia, when called into the service of the General Government. He may place them under the command of officers of the army of the United States; to whom in his absence he may delegate the powers vested in him by Congress." "The governor of a State has no power to depose an officer of the militia, or to interfere with the organization of the regiment to which he belongs, after such regiment has been accepted and mustered into the service of the United States."

There can be no misunderstanding of such plain English. The General Government has absolute control of the militia when she needs it. Would it not look better if this same government would equip these soldiers for service? The General Government not only has control when the militia is called into the service, but Congress has power to prescribe the discipline under which the respective States may train their troops. So far as I know, Congress has never assumed this power, but it is provided for in case that body sees fit so to act.

The foregoing is a synopsis of the legal status of the militia. It will be well to consider the general relationship now existing between the Government and the Guard.

Those of us who are comparatively young in the service have seen wonderful changes for the better in this matter. Of late years the interest of the Government in the Guard has been steadily increasing and the Guard now stands nearer to the Government than ever before. Many causes have helped to bring this about.

Every civilized country in the world is paying more attention to its military forces and munitions of war, than ever before. Threatened wars and trouble with other countries have caused those in authority to look at our own fighting forces. If we are to hold our place among the nations, we must be ready to fight for it if jeopardized. Then, too, the Guard itself has by its own exertions demanded attention. It has made itself worthy of attention. The appearance of forty-five thousand militiamen on Broadway, New York, at the Washington Inaugural Centennial in 1889, opened the eyes of our own statesmen, and was a revelation to the foreign officers who witnessed the parade. Officers educated by the Government for the profession of arms are now detailed as inspectors and instructors in National Guard camps. Regulars and National Guardsmen are sent together into camps of instruction. The regular army and the National Guard are drawing towards each other. Old-time jealousies are vanishing as each recognizes the position of the other in their relationship to the country. Officers and statesmen of high rank are endeavoring to get a just recognition of the Guard by Congress.

The people are gaining confidence in it. It is of the people and near to them. There can be no army in this country excepting a volunteer one (service in the militia only, being compulsory). The wars of this country have been fought by the volunteers, and it may occur to you that this country had never been whipped. The young men in the Guard to-day are of the same stuff as those who crossed the Delaware with Washington, and trounced the British under Jackson.

The regular army and the National Guard must be the country's reliance in case of need, as a nucleus and training school for larger bodies of troops. The regular service is receiving a good deal of attention, and let us hope that the Guard will not be forgotten. The Government expects loyalty and devotion of every Guardsman. Would it not be just to give him proper recognition? The first call for help would be answered by the National Guard. The country would expect it to answer promptly, and the Government should equip these men so that in arms they would be the equal of any soldier—in personnel they are the best in the world.

The American volunteer is the grandest prototype of a soldier ever presented to the world. He has put forty-four stars in the flag, and by the Grace of God he will keep them there and add to the number.

II.

"Position-finding and Position-designating Service."

Lieut. Henry L. Harris, 1st U. S. Art'y.

CAPTAIN CHESTER in his very readable article prefaces his paper with the remark that this is a question of prime importance, and has been very much in the air of late in all artillery circles. That is the one great trouble with it; so far as our service is concerned it is indeed very much in the air and needs the weight of a united artillery sentiment to bring it down to *terra firma*, where it belongs. Unfortunately, those who appear to take the greatest interest in the subject, are unable to do much more than theorize, because of their inability to test their theory, as they build it up, by the actual practice necessary to determine the best method of overcoming each difficulty as it arises. And that there are many and serious difficulties to be overcome, no one who has given the slightest attention to the details of a system can for a moment doubt.

Without any desire to touch upon the transcendental phase of the subject, let us look at one figure in the ordinary matter of fact assemblage forming the proposed position designating service—namely the commandant of the fort.

In a previous paper by the same author, and to which we are referred in the article now under discussion, we are shown an imposing picture of this gentleman, in his conning tower, at his telescope, scanning an approaching steamer. Presently he says "Ready for the position of *such and such* a steamer," (the italics are put in by the commenter) and the warning is telephoned to the base ends.

This is the snag on which every theoretical system is going to strike, notwithstanding the remark on the next succeeding page that there is nothing in the operation of this system that any common soldier could fail to understand.

Will the Captain kindly enter a little more into detail and tell us just how the base end men are going to know precisely which steamer (supposing there are more than one) the commandant is scanning through his telescope?

The article under consideration contemplates that a group of ten batteries, of four guns each, is to be manipulated throughout an action by means of a single position-finder under the control of the fort commandant. What spite has the Captain been nourishing against the mild-mannered, easy-going field officer, even if he is addicted to scanning such and such steamers through a telescope, that he wishes him placed in such a dreadful position as he might at any time after the commencement of an action find himself in? Imagine the poor man's despair as each of the ten telegraph operators in his conning tower shouted in chorus, "Where is the such and such steamer of my captain?"

Why not let each captain have a position finder of his own, so that after once being notified of the location of the steamer or vessel he is to engage, he can follow it without further demands on the commandant?

As the author truly says "In organizing for war a cheese paring policy is never profitable."

Whatever may be the fault of the author's proposed system, he is certainly far within the bounds of truth when he says that we have no system and no organization, and until we become a corps of sea-coast artillery under a competent head we never shall have.

It is easy to find fault, and generally more easy to destroy than to build up. It is suggested that it would be a good idea, if authority could be obtained for it, to commence with some system at an artillery station, on the coast and provided with new outfit, applying it first to the single gun, then to the group of three or four guns, then to a series of two or more groups, simulating the conditions of actual service as far as possible. This could all be done with no other expenditure than that of time (since it would not be necessary to fire a shot), and how a small portion of the time yearly at our disposal could be more profitably employed it would be hard to say.

If a number of systems,—not instruments,—were proposed, it would not take a great deal of practice to ascertain their several defects and advantages, and one enduring system *might* be made up from the debris of the others.

Lieut. S. E. Allen, 5th U. S. Artillery.

There are several considerations which make the present discussion of the question of position-finding very *apropos*, and which, therefore, aside from the attention that Captain Chester's vigorous style of treatment would excite, gives to his article, "Range and Position-Finding Service," a special interest.

These considerations are: *First*, We have no adopted system. *Second*, We will need a system with the new armament and fortifications now promised. *Third*, The system should be perfected, tried practically and proven, before the permanent works are constructed, so that the proper provision of conning towers, observation stations, communications and conduits for electric lines can be made.

It is evident that no obsolete or incomplete system will be adopted. It is therefore useless to elaborate a system which contemplates the use of obsolete devices. The old plotting boards with strings or wires, or protractor and vernier, are obsolete, except for temporary use should the other systems become inoperative during action.

Within the limit of its accurate operation the depression telescope is accepted as the most convenient position-finder when an elevated site is available.

Lieutenant Fiske of the Navy has solved the problem of the horizontal base line method.

By either method the position of an object can be continuously and accurately indicated on a chart situated in a safe operating room,—the commander's headquarters. These eliminate all errors of telephone operators, and the electrical connections are no more liable to disturbance than those of the telephone.

The next important step is to "designate the position" to captains of batteries.

Lieutenant Fiske's method (as previously described in the *JOURNAL*, and more graphically illustrated in the recent reprint in the *Army and Navy Journal* of a translation from the *Revue d'Artillerie*), is a very simple one for one or two batteries; for a system of several batteries it involves a very complicated machine at the plotting table. But it eliminates, so long as it operates, the errors and delays incident to Captain Chester's system of telegraphic and telephonic "designation," and avoids the use of squares.

Captain Zalinski proclaims the necessity for a method by which the whole system of "designators," or indicators, may be connected in series, so that any indicator may be connected in or cut out of the circuit at will, without interfering with the others. Such indicator is not only to permit the polar coordinates of the object from some definite point to be continuously exhibited at the battery or gun, but it is to act as a "converter" as well, and announce the true polar coordinates from that battery or gun, i. e., the azimuth angle and range from that particular battery or gun.

This differs from the Fiske plan above referred to, by having the "converter" in the indicator for each battery, instead of having them all on a plotting table with a separate circuit for each.

The practicability of Captain Zalinski's idea has not yet been demonstrated (to my knowledge). A very close approximation to it may be devised by an application of the Fiske principle in the following manner.

One of the arms of the commander's plotting table—the only one, if a depression position-finder is used—will be made to sweep over an arc of metal as in Fiske's instrument, and a corresponding pointer, pivoted at the same point on the captain's chart, may be set at the same angle by simply moving the pointer until the galvanometer needle points to zero.

A slide may be moved along a metal scale on the arm of the plotting table, and a corresponding slide may be moved on the captain's pointer until another galvanometer reads zero. If the arm and slide on the plotting table be so moved as to cause the slide to follow the trace of the vessel as it moves, the polar coordinates of the vessel from the commandant's station will be indicated, and the position of the vessel plotted on the captain's chart. This constitutes the "indicator."

To adapt this information to the captain's wants, something more is required.

Pivoted in the slide on the captain's pointer may be a second rod, passing through a slotted post pivoted on the chart at the point locating the captain's position, or that of the directing gun of the battery. The range and direction of the vessel as indicated by this latter rod—the polar coordinates of the vessel from the battery—will thus be continuously shown for the captain's use. This is the "converter."

In the same way these coordinates may be exhibited on the traverse circle and on

the quadrant used in giving elevations, and the gun may therefore be kept continuously training on the moving vessel.

The adoption of such a system would require none the less a trained corps of operators, and a systematic and trained detachment of signal men, telephone and telegraph operators; but the principal vocation of the latter would be to handle communications generally and to transmit orders, while the angles would be taking care of themselves.

As a means of controlling the position-finding operations, the commander's conning tower should be equipped with a depression position-finder (if the site affords 50 or 60 feet or great elevation), or a Fiske instrument, with a base-line of 100 or 200 feet and convenient covered way connecting two stations. By either of these an approximate determination of position of objects at even great distances could be made directly under the commander's eye. These approximately determined positions could be "indicated," by the method above described, to the observers at the remote stations of long base-lines, and their telescopes thus directed so nearly upon the particular vessel desired that there could rarely be any confusion or misunderstanding as to the object intended. The plotting table connected with the instruments of the long base-line would give the accurate determinations upon which all calculations and "indications" depend.

III.

"Infantry Fire."

Maj. Arthur MacArthur, Jr., A. A. G.

THE admirable discussion of Infantry Fire, presented by Lieutenant Davis in the March number of the JOURNAL, is well calculated to attract general attention, as it raises a question as to the practical value of our firing regulations as a means of training men for the exigencies of battle.

Lieutenant Davis declares without reservation, that the fine target record obtained under our present system does not justify the conclusion that the army is in a good condition for battle. As this deduction was made after mature investigation at the Infantry and Cavalry School, the only institution in the country at which small-arms fire is made a subject of scientific inquiry, it seems worth finding out how much the actual state of the case sustains such pessimistic views.

Prior to 1870, all conceptions in respect to infantry fire were based upon the ballistic qualities of moderate-ranged muzzle-loading rifles, which, generally speaking, were sighted up to four or five hundred yards only. It was laid down that fire could only be considered effective at close range; and therefore, before commencing the fire-fight, every effort should be made to get troops within such distance of an adversary, that the intervening space could be swept with a storm of bullets, the useful effect of which was supposed to depend almost entirely upon the skill of the individuals composing the firing line.

In 1870-71, however, the French introduced an entirely new feature in war, by making use of a rapid long-range infantry fire, the dissolving effect of which was so appreciable upon both supports and reserves of the opposing force, that it was found impossible for them to advance, even in extended order, until infantry was engaged to neutralize to some extent the long-range fire employed against them.

The Germans were thus confronted by unexpected and novel conditions, under the pressure of which it became apparent that a new method of handling infantry fire was essential to a successful prosecution of the war. In the first instance it was soon ascertained that the independent fire of individuals was of little or no advantage beyond 400 yards. Through further experiments, conducted in the presence of the enemy, it

was discovered that the concentrated fire of a mass, under intelligent direction, was effective up to the longest ranges. Arguing from these premises the Germans embodied a fire discipline based upon the idea of the regulated action of a number of rifles, against a named objective, in obedience to the will of a single man.

Since the Franco-German war, extensive experiments have been conducted by the essentially military nations; musketry regulations have expanded and multiplied until redundancy of material relating thereto has raised infantry fire into a distinct and most important branch of professional study.

Systematic investigation cannot but deeply impress the inquirer with the great importance that is attached to the subject in the gigantic armies of Europe, and with the minuteness and completeness with which its practical aspects have been considered.

While the military world abroad has been sedulously endeavoring to devise a fire drill that will conform as far as possible to tactical realities, the United States has confined fire training to a primary system of target practice, based upon the fallacious belief that the skill of individual soldiers is the only criterion of the effective fire of a mass. The modern theory of the collective controlled fire is practically unknown among us. In proportion as this is important, our system of training is defective; and to such extent Lieutenant Davis is sustained in asserting that we delude ourselves, in assuming that the remarkable individual proficiency of our men will ensure effective fire on the battle-field.

Lieut. A. S. Frost, 25th U. S. Infantry.

Lieut. Davis' arguments against the present system of rifle training and in favor of collective fire are, in my opinion, simply unanswerable.

The absurdities of the present system have long been apparent to infantry officers generally, but, as the endeavor to give the soldier a warlike instruction usually resulted in a corresponding diminution in the array of figures supposed to represent the warlike efficiency of the company, and as a bad showing on paper sometimes led to censure from those in authority, company commanders were reluctantly forced to sacrifice everything to the attainment of a satisfactory record.

The evils of the record system are manifold.

I believe that the target reports were the first official documents issued in our army which cast a slur on the certificates of army officers; the "iron-clad" certificate would naturally lead outsiders to suppose that "the powers" had their doubts concerning the integrity of the average line officer.

That this certificate did not allay all suspicion may be seen from the amendments afterwards introduced in the regulations; in fact, those amendments furnish all the proof needed to show the evils of the record system.

Why, for instance, was it found necessary to place a red pencil mark over shot holes?

Why was it found judicious to take markers and scorers from a company other than that shooting?

Why were other measures of a kindred nature considered necessary?

That the record system did not lead to the proper instruction of the soldier even in individual shooting may be seen from the custom which prevailed when company records were at their highest. I refer to the custom of giving an unlimited supply of ammunition to the good shot at the expense of the poor one.

This evil is now remedied, at least in part, but it can never be wholly remedied so long as a good company record is the principal object aimed at.

Another evil is the avoidance of "wind and weather" in target practice, as Lieut. Davis has shown.

The eagerness to acquire a good figure of merit has led officers to do all the work of the practice, short of pulling the trigger, for their men; I have seen them stand behind the soldier, regulate his rifle, correct his windage, elevation, etc., and even hand him his cartridges and shade his eyes. What man after such fostering care ever accomplished anything when left to himself?

In the race for a record, men known to be good shots have been coddled and petted until there was no living with them; for without such coddling what would become of the record? Thus discipline has suffered. Men of this class have even set up their will against that of the officer, and, too often, it has been overlooked as due to their nervous anxiety to make good scores.

The system of instruction pursued makes no attempt to recognize the officer as "a leader of men" or to make him such; it rather seeks to place him upon a level with the men. The system of offering prizes for officers to win from the men, would find a parallel in the schoolmaster who should offer prizes to his pupils and then himself enter the lists and filch them away.

The system of skirmish-firing as laid down allows the men to judge of everything, except the moment of opening and ceasing fire, without regard to their officers. Indeed, if an officer were to make a suggestion during this fire, the score so made would probably be thrown out. Thus, far from teaching the men to look to their officers for directions regarding the collective fire, the practice is discountenanced.

The rule requiring a certain number of rounds to be fired in a given time, gives men the impression that rapid fire is desirable, and they have no idea of husbanding their ammunition, the importance of which has never occurred to them.

The estimation of distance in collective firing is now a mere farce. Lieut. Davis' suggestion regarding this fire is a good one where it is feasible.

Our present firing regulations have many good features, and although I think there are certain errors, I do not wish to be understood as decrying the whole book. I think the general system of individual instruction is excellent. I think, however, the author only claimed for his system that it was to lead up to something better.

In suggesting remedies I would favor, first of all, the abolition of the figure of merit; and, if reports are needed as a check upon company and post commanders, they should only show that each man had had the due amount of practice. Inspectors-general could judge of the rifle-training of a company upon the ground, and their reports would furnish a much better idea of the condition of a company than do the present target reports.

I think with Lieut. Davis that it would be well to abolish the bull's-eye and rings; but I would substitute therefor the figure of a man upon the rectangular target, and, for purposes of instruction, it would be well to retain marking and signalling, valuing a hit on the figure *two*, a hit on the rectangle outside of the figure, *one*. The soldier should be required to aim at the foot. After careful instruction, it might be well to let the soldier use his own judgment and do without these artificial aids, as Lieut. Davis suggests.

So much for the individual training of the soldier.

I look upon the collective fire as the school of the officer and non-commissioned officer. In this school they should practice the use of cover, the estimation of distance, and above all the art of COMMAND.

Individual fire has been greatly overrated in this country, and a healthy reaction is about due. It is my earnest hope that Lieut. Davis' able article and the discussion to which it may give rise will hasten that event.

IV.

"The Dual Nature of Coast and Harbor Defense."

Bvt. Brig.-General Henry L. Abbot, Colonel, Corps of Engineers.

THIS paper, discussing the subject from an English point of view, is an able refutation of what in that service appears to be generally regarded as heretical opinions, although uttered by so distinguished an army officer as Sir William Jervois. In this country the discussion will attract attention, in view of the fact that opinions favorable to the transfer of the land defenses of our coastwise cities to the navy have recently been expressed by individual naval officers.

It is difficult to believe that such opinions are seriously advocated by professional experts. The whole tendency of modern science is toward the creation of specialties, and rightly so, because experience has proved that it is only by restricting the field of research that rapid progress can be made. The men who to-day hold the leading positions in the great departments of human knowledge are not those who have a smattering of information in many branches, but those who are profoundly versed in their special field. It is commonly believed that the new problems, purely naval, which have arisen in the transition period in which we are living, are enough to absorb the whole attention of our seamen, however able and diligent. Why then burden them with another and distinct class of investigations?

What is true for the grade of officers is equally so for that of enlisted men. The armament, the carriages on which it is mounted, the emplacements, and in a word the whole surroundings on the land, are different from those to be found on our ships of war. Why then attempt to drill men for both land and sea service when they can serve in only one capacity when the crisis comes?

Again, it appears to be the consensus of naval opinion that the difficulty of obtaining American seamen for our ships of war is so great that, in order to provide an adequate personnel, the expense and labor necessary to form a naval militia reserve should be incurred, and this, not only on the sea-coast, but in the interior. Why then more than double the numbers needed of these trained men by assigning sailors to shore duty?

Finally, it may be suggested, why not begin nearer home, and train the officers of our ships of war to serve indiscriminately as sailors, gunners, marine engineers, surgeons and chaplains; when this is successfully accomplished it will be soon enough to inaugurate a land campaign.

The staple argument that unity of command is essential in conducting the defense of a harbor may be conceded; it is held by the President of the United States under the existing system. If honor and duty are not enough to induce cordial cooperation between his lieutenants on land and sea, it is a simple question of discipline. One commander removed from his post for such neglect of duty will be enough to encourage the others to follow the examples of mutual right feeling so often recorded in our history as a nation.

Whatever enthusiasm for change may suggest, it certainly appears to be the part of conservatism to defer to the twentieth century the spectacle of a hermaphrodite defender of the coasts emerging from his mortar battery or position-finding station, doffing his spiked helmet, which, since two Germans vanquished one Frenchman, appears to be the accepted headgear for a hero on land, donning his natty tarpaulin hat with its yard of black ribbon streaming over his port eye, and stepping sadly into the patent machine for producing sea sickness artificially, to undergo the daily drill which

forms part of the training needful to qualify him to meet the enemies of our country on land or sea.

Lieut. E. M. Weaver, 2d U. S. Artillery.

There are a number of indications that the question of the control of coast defense is, at last, up for serious consideration. It has been too much the tendency of those officers of the army, who have ventured to express themselves on the subject, to treat it lightly, if not in a vein of jest, or even ridicule, as was done recently in this JOURNAL.

The earnest effort the navy has been making for some years to get ashore in connection with coast defense, has been apparent to a few army officers; occasional references to the fact, however, have seemed to excite no interest. The openness of the stand taken by the navy during the past year, especially as evidenced in the essay of Lieutenant Rogers, U. S. Navy, in the last annual of the Naval Intelligence Office, leaves no doubt in any one's mind as to the intent of the navy, and appears to have served to arouse a ripple of interest in the army. Whether this dies away or increases and spreads, is a matter of some importance.

The article in the March number of this JOURNAL, entitled "The Dual Nature of Coast and Harbor Defense," by "a Staff Officer (British)," reprinted from *The United Service Magazine*, London, reveals a fact that has been well known to many,—that the English have been called upon to meet this same question of the control of sea-coast defense, in connection with, and as a part of, an extended discussion and investigation, that has included the subject of artillery organization.

On the continent of Europe fortress artillery has for some time been distinctly separated from field artillery; but the practice in England, which has been the same as our own, recognized no division of a distinct and radical nature between field artillery and garrison artillery; officers were transferred from one branch of the artillery to another promiscuously. It became evident to many prominent British artillerymen that the best interests of both the field artillery and the garrison artillery were sacrificed by this system, and, in obedience to a general demand, a committee was appointed in 1887 to consider the whole subject. The committee met and received verbal and written testimony from all the prominent officers of the service. (See *Edinburgh Review*, January, 1889.) The report of this committee has recently borne fruit. By Army Order No. 136, which went into effect August 1, 1891, the garrison artillery will hereafter form an independent corps, and to this corps is assigned the defense of the coast (see *Revue d'Artillerie* for October, 1891, p. 56). We are thus left as the only first-class power that has not assigned its coast defense to a special body of troops. In view of the published accounts of this change in the organization of the Royal Regiment of Artillery, it seems strange that some detailed reference was not made to it in the article under discussion.

On the continent the control of coast defense is entrusted to the naval branch of government. But neither the continental practice nor that of England is to be accepted necessarily, as a guide for us, since the conditions of the problem are materially different with us. (See p. 12, *United Service Magazine* (Hamersly's) for January, 1892.)

In the discussion of this subject it has been the custom to advocate either that coast defense is an essential part of the navy's work, or that the duties of coast defense naturally pertain to the army; or finally, as advocated by "a staff officer," that the sphere is a double one, and the responsibilities and duties dual between the army and the navy.

It has seemed to the writer that each of these three positions is open to criticism.

We need in this matter, above all, to keep in mind what is *the army*, properly so

called, and what is its normal function, and, likewise, what is *the navy*, and its proper function.

The one cardinal function of an army, that stands out in relief from all others, is, its power to manoeuvre. As a result of centuries of experience a system of organization has been evolved which has for its controlling feature mobility; mobility of the army as a unit, and of the parts of the army with respect to other parts; that is, strategical manoeuvres and tactical manoeuvres.

An army, in the modern acceptance of the term, is an active aggressive mass of men, divided into army corps, divisions, brigades, batteries, etc., susceptible of being moved expeditiously from point to point in a theatre of war against a similarly active and mobile mass of men. It may be laid down as a fundamental principle that, in so far as this mobility becomes restricted or impaired, the influences so operating are harmful to the highest interests of the army and obstructive to the grand object of its organization.

Coast defense stands in every sense directly opposed to the idea of mobility as here presented. It is essentially a passive, fixed, immobile service. Geographically it is limited to the narrow line of the sea frontier. It must be admitted that if a part of the personnel of the army be diverted into such a service, the army proper suffers. The infantry, cavalry, and light batteries are entitled to all the fighting men authorized by law for *the army*. If our country to-day needs an army of 25,000 men, as it undoubtedly does, it is robbing some part of the army if one-sixth to one-seventh of the entire authorized force is tied down to the sea-coast, utterly divorced in thought, training, and associations from what constitutes the real army—the infantry, cavalry, and field artillery. Infantry and cavalry officers undoubtedly felt the force of this argument in the recent skeletonizing process, and had good grounds for complaint. Abstractly considered, the principle is wrong, just as much so for the entire three thousand troops constituting our present foot batteries, as for the few abstracted two years ago from the other two branches of the service.

But the argument is used that these batteries of heavy artillery can, in time of war, be utilized as foot troops in connection with the army in the field. This idea has been the bane of the artillery; our chief troubles can be traced to this fallacy. We are all familiar with the facts of history in the matter. Under the operation of this idea the artillery, not mounted, has seldom been permitted to do anything but infantry duty. While it is to be expected that any part of the armed forces of the nation, military or naval, may, in case of an emergency, and for a limited period, be withdrawn from its legitimate field of work, and assigned temporarily to some task foreign to its regular work, it is in the highest degree subversive of the interests of the arm, and a proper *esprit de corps*, to employ a body of troops, as our artillery has been employed for years, and indefinitely, for general service in a field and in duties apart from those rightly belonging to it, training it in the duties of another arm and leaving its own proper sphere absolutely neglected. One of the strongest arguments against placing coast defense under army control is, that the temptation will be to continue to take the sea-coast artillery from the forts and guns along the coast, leaving the coast for long periods naked.

We have only within the last two or three years partially been relieved of the evils just referred to. The wise action of our present Major-General commanding the army has eased the situation considerably, but, it must be remembered, that this partial escape is due, perhaps, solely to the accidental fact that the senior Major-General of the army was formerly an artillery officer, and therefore happens to have some interest in the arm and knowledge of its proper work. The fact remains, however, that our present status is purely accidental. If our next major-general com-

manding should happen to be an officer who had passed his early service as an infantry or cavalry officer, he would, of necessity, be more or less ignorant of sea-coast guns, forts, torpedoes, foreign war-vessels, range and position finding, and the multifarious details of coast defense service. In such a case would not much of the progress that has been made be apt to be lost, or, indeed, the entire scheme lapse? Every one must see that a service marked off so distinctly as coast defense is, cannot be considered the natural and rightful command of General Officers of the army. Coast defense bears no relation whatever to the army or its movements; it does not constitute an integral part of the army brigade, or the army division, or the army corps, and therefore no General Officer of these subdivisions can be considered to have a natural right to command it. Coast defense is, without doubt, the most intensely special service in the whole range of military service, and, as such, it should be separately classified, organized, and commanded; more so, even, than the engineers of the army or the marines of the navy.

If the army be handicapped by being weighted with such a passive, immobile service as coast defense, the navy would, of course, suffer still more. How very wrong it would be, in the first place, to take 3000 to 4000 men from the force allowed to the navy and anchor them to the shore. Either this has to be done, or a new corps created for the work by Congress. But immediately the question arises: Why should Congress increase our present war forces by so many men, when there are enough artillerymen now in the army to give a full complement of field artillery to our present force of infantry and cavalry, and leave a surplus sufficient to meet the needs of sea-coast defense for years? We now have ten mounted batteries. If one more battery were mounted in each of the five regiments of artillery, we should have fifteen light batteries, which, with six guns to a battery, would give us ninety guns; allowing three guns to a thousand men, we should have field artillery sufficient for 30,000 infantry and cavalry. There would still remain, after this, forty-five batteries with a present strength of about 2700 men, which could easily be increased two and one-half-times, in case of war, by simply adding the men to the batteries. This force of 2700 men could, for years, do all that is necessary in the way of preparing for our new forts and guns, and serving such guns as may be finished. The great objection to the navy taking charge of coast defense as a part of its regular work is, that since it stands even farther off from the coast defense in the scale of mobility than the army does, it would suffer from such an association even more than the army. The navy lives, moves, and has its being in *motion*; the line of the navy, like that of the army, is a mobile, active, aggressive body; its duty is to seek the enemy's fleet on the high seas, defeat it if possible, and pursue it. Just as the enemy's army is the objective of the field army in time of war, so is the enemy's fleet the objective of our naval fleet.

The proper life for sailors is "on the ocean wave." When they essay to occupy both the land and the sea, they alter their true nature, and, in becoming amphibious, they lose the chief essential of an effective navy,—that feature which has been the shining glory of our own navy in the past—*dash*.

It appears, therefore, that coast defense is a work not in harmony with the normal functions of either the army or the navy. How then can we avoid the difficulties of either by intrusting it to both, as advocated by a British staff officer? Placing it under the control of both the army and the navy would simply double the effects above indicated; both services would be handicapped instead of one. There can be no doubt it would be far better to give it entirely to the one or the other than to place it under both; in this case at least one service would be untrammelled. A divided responsibility such as is advocated by the "staff officer" would be sure to lead in the course of time to a lack of concerted action at some critical moment. The argument of the "staff officer" on

this point is weak, in truth, he abandons argument and appeals to sentiment. "If," he writes, "English sailors and soldiers have so little in common that they cannot cooperate in the supreme task of the defense of their common shores, then indeed the British Empire is in a bad way." This is very fine, but it is not war, nor human nature under the intense excitement of war. *A priori*, there should be in coast defense a single mind and a single will directing all the forces of the nation, whether fixed or floating, and the conflict begins at the very threshold, under such a dual responsibility as is advocated by the "staff officer," in deciding whether the directing mind should be taken from the water forces or from the land.

Do we not see herein the whole difficulty, and the source of all this contention between the two services? Looked at apart from all army affiliation or navy affiliation, is not coast defense a thing to be classified by itself? Is it not a class of work that ought to be organized independently of either the line of the army or the line of the navy? Ought it not to have its own enlisted personnel and hierarchy of special officers?

It has seemed that those who have discussed this subject have failed to appreciate the fact that modern conditions of shore-sea warfare have operated to differentiate a new sphere of work. Just as the navy was originally evolved from the armed forces of nations, so, in these recent times, the eternal principles of progress in all things has made necessary a new specialization in that division of national defense which lies along the sea frontier; this, by assuming all the passive features of the defense, liberates both the land and sea forces for the full employment of their respective offensive powers. It is precisely because the new service is as yet in a state of suspension, untried, and overlaps somewhat the limits of what has been heretofore considered the spheres of the army and of the navy, that we find the two services hotly contending for its control.

If we look at the problem of coast defense from a *national* point of view, in contradistinction to a partisan army or navy point of view, there is no doubt that this work should be assigned, in its entirety, to a special corps, permanent in its character, and distinct in all its features from the army proper, and, also from the navy proper.

The fact that we have in the army at the present time a greater number of artillerymen than are needed to give the proper proportion of artillery to the force of infantry and cavalry, suggests in the strongest way the propriety of using this excess of army artillery as the nucleus of the proposed Coast Defense Corps. This is further suggested by the fact that these troops are now located along the coast, and have for two or three years been drilled in a tentative sort of a way in some of the duties of coast defense.

The British staff officer urges that service in such a special corps would be unpopular. This may be true of England, but it will be easily granted that, with us, such a corps, properly organized, would be, perhaps, the most popular corps in the service of the United States, land or naval.

The Senate of the United States recognizes that coast defense is a subject apart from all other military or naval matters, by appointing a special standing committee for considering all questions pertaining to it. While we may honestly differ from other first-class powers in placing the control of coast defense under the Secretary of War instead of the Secretary of the Navy, we cannot brush aside the logic of their position in making of it an independent sphere, having its own expert personnel, from the private soldier up to the officer in command.

Such a corps, entirely distinct from both the line of the army and the line of the navy, and having connection with the President of the United States through a cabinet officer, could with equal facility be assigned to the Secretary of War or the Secre-

tary of the Navy. There are special arguments that may be advanced in favor of each, but, in so far as the workings of the corps are concerned, after it should be established it is unimportant whether the ultimate authority rests in the Secretary of the Navy or the Secretary of War. The only essential is, that the corps exist independently, and have charge of all elements of coast defense,—guns, torpedoes, and floating defense of all kinds. In no other way can unity of command and direction be attained in the defense of the coast against naval attack, and the entire defensive forces of the nation be made to work together harmoniously.

The artillery has been striving for years for a corps organization for the coast artillery, but, alone, and without the advantages of some portions of the army to secure the attention of Congress, our efforts have failed. If Congress shall seriously take up this matter, it is very possible it will look above the partisan arguments of both the army and the navy. It will act for the good of the nation. If there be any virtue in the logic of the question, a Coast Defense Corps, in some form, is sure to come. If Congress shall indicate that it prefers to place it under the Secretary of the Navy, the artillery, which has been so long neglected in the house of its friends and colleagues, cannot be criticised if it seek its corps organization in this direction.

Reprints and Translations.*

MILITARY SMALL ARMS.

By LIEUTENANT-COLONEL G. V. FOSBERY, U. F.

(From the Journal of the Royal United Service Institution.)

[By permission.]

I N the month of May, nine years ago, I stood up in this theatre to lecture on magazine guns: a subject at that time new to many of my hearers. I then proposed to lay before this Institution, and through the Institution before the Services and the country at large, the reasons which in my opinion rendered advisable a change in the armament of the soldier. I discussed the merits of the various weapons then existing, to claim adoption at our hands. I strongly advocated the abandonment of the single loader for the magazine arm or repeater, and expressed a hope that what I had to say might, in ever so small a degree, contribute to the revolution which I desired to see accomplished. In the following year I again spoke on this subject, and was able to show something of the progress that invention had made in the meantime, not forgetting to point out how some of the more ancient weapons had already been excelled or superseded, and to draw attention to newer devices.

Amongst these were the Spencer repeating rifle, Pieper's electric gun, and a sheet-metal cartridge holder or clip, which I myself had devised for loading the cartridges *en bloc* into the magazines—which, new at that time, has since been very largely developed and adopted.

The controversies of those days have now been settled. The cause I then so strongly advocated has been won, and five millions of men are now armed or arming for the battles of the world with the guns to which I then drew your attention; and so closely have some of my indications been followed, that I think I may not unreasonably claim to have directed the attention of those responsible for the change to several of the points needing consideration in effecting it.

Side by side with the change of weapons, a no less important one has been made in the ammunition they carry.

That such should have been the case is but the logical consequence of the adoption of the repeater.

* Please address communications concerning reprints, translations and reviews to Lieut. J. C. BUSH, editor of this department.

From the moment this was decided on, it was seen that, in the first place, it would be desirable to reduce the size of the cartridge so as to maintain the handiness of the weapon; and secondly, to reduce its weight in order that the soldier might carry a larger number—wrongly or rightly supposed to have become an absolute necessity.

To reduce the *size* of the cartridge, the space occupied by the charge must be diminished, and for this either the present charge must be made to occupy a smaller space, or a more energetic explosive be found.

We are thus at once compelled to use either compressed gunpowder or one of the higher explosives.

Again, to take largely from the weight, the bullet must be lightened; and here we must be careful. The range of artillery is increasing every day and the bringing of quick-firing guns into the field is but a question of time. The infantry cannot afford to lose a yard of their range. The sectional density of the bullet cannot, therefore, be lowered—nay, rather needs increasing—and the reduction in weight must be effected by a diminution of calibre.

Many of us were in hope that this would go no further than to 0.400-inch or 0.380-inch, when a plain hardened bullet could have been used, and a very considerable economy in the price of ammunition been effected.

When, however, it came to be seen what velocities, range, and penetration could be got with a thing like this, no bigger than a common pencil-case, the calibre of 0.303 was decided on, and with it, as a consequence, the metal envelope, regarding the cost and other difficulties of which so much has been said.

The studies of Hebler, Guillaumôt, and the practical experiments of Lorentz prepared the way for this or even a greater reduction of calibre; so that, in theory, no risks of mistake were run.

It may be an open question whether or no at extreme ranges the fire of the new magazine gun will be as fatal as is that of the Martini-Henry, and whether it would be possible with it to inflict on a distant enemy such terrible losses as fell upon the Russian columns in the valleys near Plevna from Turkish unaimed high-angle fire. We all know that a very small and light bullet, having a speed of 1600 feet per second or over, *i. e.*, a bullet travelling at so-called *express* speed, will smash bones and tear up and pulverize flesh in a way totally different from the behavior of the same bullet endowed with a lower velocity, and it may prove to be the case that, beyond certain ranges, the effects of the new projectile, say on supports and reserves, will be less than those of the heavy Martini bullet in a very notable degree.

As, however, we are promised an initial velocity of something approaching 2000 feet per second, no doubt we shall have an extremely flat trajectory and deadly effects for a very considerable distance, and in any case, what is true of our own bullet will—so nearly alike are they—be true of every other bullet in Europe.

At present, so far as is known to me, we are still in search of the ideal explosive: one, in fact, which shall pack into the smallest possible space, develop the utmost energy, and keep indefinitely under all possible circum-

stances; and until we have found this, or at all events some reasonable approach to it, we cannot with a light heart adopt, as our Continental friends have done, a smokeless powder for the use of our troops. Gunpowder we know all about; it is a good honest mixture, and sorely tried as it frequently is ashore and afloat, it may be always reckoned on to do its duty so long as we keep it dry. But when we come to high explosives—especially when these are chemical compounds and from their very nature more or less unstable compounds at that—we, more than any other people, must exercise the utmost precaution in their general adoption, and be sure that neither the damps and heats of India, the salt air in our naval magazines, nor the cold of Canadian winters, will set these treacherous substances fermenting, decomposing, or exploding.

Hitherto perhaps on the whole Professor Abel's powder, cordite, has shown the best all round qualities, and bids fair for final selection.

Having thus spoken of the ammunition question, which will, I believe, when fully settled, effect a more marked change in the conditions of war than even the adoption of the magazine gun, I will, if you please, return to the question of the latter.

It will be, I think, a useful introduction to the study of the weapons themselves if we look for a moment at the general principles which have governed their construction. As you see here without a single exception, the infantry weapons of to-day are bolt guns. We ourselves, after more than thirty years of experience with the Snider and Martini—those good, solid, eminently safe, and more than all safe-looking guns—have come to use a bolt, the forward end of which takes the whole face of the discharge, and the hinder end of which points directly into the soldier's eye at the moment of firing; and more than that, we fire it ourselves, and give it to our men with perfect confidence. The loss of faith in their weapons which would follow any serious accident would be so disastrous to the *morale* of the army, that even were we not as we are, to a degree solicitous about the lives and limbs of our men, sound policy dictates an extraordinary care in the selection of their fire-arms. This is so well understood abroad as well as here, that you will notice in all these weapons a massiveness and weight of metal far beyond the proportions that would be required to stand the charges they are expected to fire, or than is rendered necessary solely by the rough usage to which they may by-and-by be exposed. We, more than others, so far as our system will allow of it, take particular pains to make our guns as light as possible consistent with that strength, and incur great expense in doing so.

Did we know as much about the marching of our soldiers as we do about the running of our horses, I could no doubt inform you what difference it would make in the time of a 10-mile march were the men's guns lightened by an ounce apiece.

But the advantage we gain can be put in another and very intelligible shape. If we take a pound off each man's rifle and give him a pound more ammunition to carry, 5000 men will carry over two tons more of weight of cartridges on their bodies. And two tons of ammunition judiciously thrown in are capable of doing a vast amount of useful service: besides which

as ammunition is more easily carried than an equal weight of gun, for the reason that it can be more easily distributed, the soldier is still the gainer.

The bolt principle on which these weapons are constructed has no doubt several grave disadvantages. Some of them have been minimized in the later guns, but some still remain in full force. To carry the bolt and ensure its correct movement, a long action or shoe is required; and when, as in most of these guns, the abutment which supports the bolt against the force of the discharge is at the rear end of the shoe, the walls require to be of considerable strength and weight to secure absolute safety, as does also the bolt itself.

We are compelled to use a shorter barrel, or if not, the shoe and bolt at all events occupy a disproportionate length in the gun, and weigh more than is necessary. In any case, compare these cumbersome contrivances, which are more or less inseparable from the system, with the small neat wedges of the Sharpe, Field, or Deely-Edge rifles.

There is, however, a form of bolt gun where this shoe can be modified in many ways, nay, almost entirely done away with, and the safety of the locking device still be maintained. I mean when, as in the German, the Mauser, and the Godsall guns, the locking device consists in wings or projections on the head of the bolt, which lock (something on the cut-screw principle) into recesses formed for them, either in the barrel itself or in the forward end of the shoe. We thus have a mechanical equivalent of the wedge, but brought into operation by a circular instead of a vertical motion. The rest of the bolt then becomes merely a means of rotating its forward end, and a convenient carrier for the mainspring, extractor and firing-pins.

Major Godsall has been the first to see the full importance of this peculiarity, and has substituted for the shoe a simple rail on which slide to and fro the block, the lock, and the extractor.

In the early days of repeaters, two methods of converting the bolt gun for the purpose occurred to the inventors of that day. They either adopted the Winchester tubular magazine under the barrel, and concealed it in the wood of the fore-end, *e.g.*, the Kropatchek and Mauser; or they placed a similar tube in the stock, as for example, the Hotchkiss, Shulhof, and Deely-Edge. It was reserved for Lee to devise the position for the magazine, and method of feeding up the cartridges, recognized to-day as the one which for military purposes will supersede all others; placed symmetrically and close to the centre of gravity of the arm, the magazine, when full, causes neither breech nor muzzle preponderance (to borrow a phrase from our friends of the artillery), and the act of emptying it lightens the gun without disturbing its balance.

In the Kropatchek and similar weapons, as the magazine was emptied, the muzzle tended to rise; and when firing at an advancing enemy, increased the elevation the nearer he came, and though the others had the opposite tendency, the leverage on the gun was so much less that it produced no positive advantage.

Moreover, notwithstanding the professions of inventors that these tubes formed a practically safe method of carrying loaded cartridges, when the

bullet of one was continually in contact with the cap of the next, no one absolutely believed there did not exist a risk which it would be a relief to get rid of; and when Lee showed them the way to do this, they one and all seized on his idea, with or without his permission, and the results are here in this rack before you: the Mannlicher, the Mauser, the German and Italian, all alike owing their success and adoption to the principle he discovered for them, and to his years of laborious, and often hopeless, struggle.

Our own weapon, as of course you know, is the Lee, rifled upon Metford's system, which includes not only the form and pitch of grooves but the method of cutting them, and having certain minor improvements, which the experience gained in the trials to which it was subjected has suggested besides being fitted with a divided stock, which has improved and strengthened the gun.

The remainder are bolt guns of various types, some of them having interesting and novel details of construction, but all of them alike indebted to Lee for the position and operation of their magazines.

The next point is the method by which the magazines are filled.

In the old times of tubular magazines, the cartridges were inserted one by one through a trap, and against the pressure of a spring, except in the case of Shulhof, whose gun, unacceptable for other reasons, was yet admirable for the way in which the difficulties of cartridge supply were got over, and for his method of loading from boxes.

The early Spencer musket, too, which was used with such signal success in some of the actions of the American War of Secession, had a notable device for getting over this difficulty. The tube in the stock had a steel lining, which contained a spiral spring, and was fixed in place by a bayonet catch, in the butt. To load, this tube was withdrawn, spring and all. The cartridges were then dropped into the hole, and the tube returned. This slipped down outside the cartridge, the spring being at the same time set in compression, and seven rounds were thus inserted very easily and quickly.

Now, however, that the central magazine has been universally adopted, the problem has become a far easier one, and the cartridge carrier or clip has come into use in every case but our own. This in its turn has effected a singular change in the ideas prevalent as to the true uses of the magazine gun; for those who have adopted the clip have at the same time entirely abandoned single loading for ordinary occasions. The soldier is taught to fire exclusively from the magazine; one clip when emptied is replaced by another, and as these clips do not contain more than five rounds each, there is not in the gun, even at the best of times, a sufficient reserve of ammunition to meet a rush; while the soldier can never be certain exactly how many charges he has to dispose of before he must reload. Moreover, he must exhaust the clip he has, before he can replace it with a full one.

Thus the clip system for ordinary occasions accelerates the fire of the weapon, inasmuch as five cartridges can be put in nearly as quickly as can one in single loading, the other operations being the same in both cases; but to get off ten rounds, the soldier will almost certainly have to put in

two clips besides the one already in place, and, as will easily be seen, the whole process is a slower and less effective one than the withdrawal of the "cut-off," and the emptying of the magazine at the moment of special need.

Now though this system runs counter to the original conception of special reserves of ammunition for special occasions, there are not wanting those who hold that the five cartridge clip system is a better one than our own. Their main argument is this, that the soldier should not be taught in cases of emergency to do anything which he is not in the habit of doing on every other occasion; if he is, confusion and disaster are likely to accrue. But let me ask you who, in your opinion, is likely to keep the cooler head, and meet a sudden attack with that steadiness of mind as well as hand, which alone carries the man triumphantly through sudden and imminent peril—the man who, having one round in his gun, knows he will have to fumble in his pouch for the next; the man who, some time since, put five cartridges into his gun and knows not how many he has left, and when he shall have to reload; or he who, by simply touching a slide, puts at his own disposal enough ammunition to see him through any crisis without having to think of reloading at all? I think there can be no doubt of the answer. We must not forget, however, that while we hold in this particular undoubted supremacy, the every-day fire of the clip guns must exceed our own in rapidity.

If a method of loading our magazines *en bloc* could be devised, I am of opinion that a great advantage would be secured; some ingenious gentleman has, I believe, imagined that the difficulty can be got over by using two clips at once, actuated by a couple of spring arms placed side by side, but this no more gives us a reserve for an emergency than does the single clip system; and the uncertainty of what the gun may at any given moment contain remains as great as before.

Briefly. The controversy lies between "cut-off" and "no cut-off," and not, as might at first appear, between two different methods of filling the magazines; the "cut-off" in our case being a simple steel plate, and adding no complication to the gun worth a moment's attention.

We have, to sum up, now arrived at this point, viz., that the military small arms of to-day are bolt guns on various plans, but one and all having magazines of the Lee type (see Plate); that there are two methods of filling these magazines, the domestic way with the fingers and the foreign way with clips; but above all, that there are also two ways of using these magazines, the one as an accelerator of the ordinary rate of fire of the weapon, the other as a valuable reserve for moments of more than ordinary exigency or peril.

We have also been able to form some idea of the arguments which may be used for and against each of these methods, and I will now, if you please, commence an examination of the guns themselves, beginning with the German.

This gun, besides its magazine, has many interesting features which well merit our careful attention, more than one of them being entirely new departures,



BERTHIER RIFLE, FRENCH.
For description see Journal No. 55, page 181.

For description see JOURNAL, No. 55, page 163.

For description see JOURNAL, No. 55, page 163.



For description see JOURNAL, No. 55, page 163.



For description see JOURNAL, No. 55, page 163.



For description see JOURNAL, No. 55, page 163.



As you see it, the first thing that will probably strike you is the great size of the barrel, and secondly the small size of the magazine as compared with our own and other patterns.

The true barrel, however, is not seen at all, except just at the muzzle. What we have here is an outside casing of thin steel, strong enough to take all the knocks it may get, to protect the shooting barrel from injury and to carry the bayonet and sights; the air space between the two prevents it from becoming so overheated as to burn the hands or melt off the sights in rapid firing.

The true barrel is secured to this casing at the breech end, but at the muzzle passes freely through the tube which terminates it at that point; it can thus expand or contract freely, a very great advantage. We all know how often the shooting of a rifle was spoiled by tightening up one of the screw bands unduly, and how when the wood to which the barrel was secured shrunk with heat or swelled with moisture, it was liable to go a bit off its shooting on its own account.

Here, of course, nothing of the sort can occur.

Some ingenious plagiarist has lately done this simple arrangement the honor of improving upon it; he fills the air space with some absorbent substance, provides a water tube to wet the same, and makes a hole near the muzzle for the escape of steam.

I think we can some of us guess in what condition such weapons would be found a few months after issue.

We next come to the magazine, which is, and looks, extraordinarily small; there is, however, room in it for the five cartridges it is intended to contain, and the clip which carries them. There is but little to note in the magazine beyond the simple form of the spring and the platform attached to it to bring up the cartridges; the platform, when the magazine is empty, converting the gun into a single loader. It cannot, however, be used as such as long as any cartridges remain in the magazine.

Lest, however, it should be necessary at any time to fill it while two or three cartridges may still be left, provision is made for ejecting the clip and whatever is in it by touching a spring which releases it and it is then thrown out of the gun by the cartridge elevator. A full clip can now be inserted; this is a device, however, which is necessarily wasteful, and would probably be seldom resorted to.

However, here is the clip system at its very best, and an inspection of this gun will enable you to compare it with our own. There are, besides the outer barrel and magazine, one or two valuable points about the action. In the Lee, and several other bolts, the spring is set to full cock by means of a catch or bent attached to the firing pin, which is held back by the trigger or sear when the bolt is sent home; and when the latter is locked is retained in tension until released by the action of the trigger.

In this gun, however, as in the old Chassepôt and others, the body of the bolt carries an inclined plane or cam which abuts against a piece attached to the firing pin at its rear end; when the bolt is rotated to open the gun, this cam sets back the firing pin and retains the spring in compression until the bolt is returned to its place, when the act of locking it releases the firing

pin, which is, however, now held in place by the sear until the gun is fired as before.

This arrangement has the distinct advantage of relieving the soldier's hand from the jarring action caused by having to send the bolt home against a powerful spring with the palm of the hand or muscles about the base of the thumb, an action which in rapid and prolonged firing has been found to cause serious damage to the soldier's hands from the mass of nerves which are involved and which get bruised and injured.

Again, the recoil being supported by these wings, which take into recesses in the action close behind the chamber of the gun, the rest of the bolt becomes, as I have said elsewhere, merely a means for operating the locking device, and carrying the extractor, the mainspring and firing pin; and the inventor takes advantage of this circumstance to make the shell of the bolt thinner than could otherwise be done, which gives him a larger and more powerful mainspring.

Mausier has gone still further in this direction; but in the opinion of those competent to judge, he has left so little metal, especially at the part where the handle joins the bolt, that a heavy blow (as in some bolt guns is sometimes necessary to release the cartridge), or any rough usage would be apt to deform the tube at that point or detach the handle altogether.

But the Germans seem to me to have got their advantage without weakening the gun, and those who know how difficult it is to make long wire springs of very small diameter work freely and pleasantly, will appreciate the advantage they have secured.

Yet another device is the neat little starter on the left side of the head which, lying under the head of the cartridge as it is withdrawn, brings up against a stop in the shoe at the end of the stroke, and throws it out of the grip of the extractor and clear of the gun.

It is very neat, but I recollect seeing its exact equivalent in a carbine by Bethel Burton which I once showed in this place, and which at that time (eight years ago) was already a weapon of very mature age. Most of these little things have been invented and reinvented so often that no one knows exactly or could discover if he wished it where they come from, and I have heard in explanation of what would otherwise in some instances look like, to say the least of it, a misappropriation of ideas, that the inventors personally are all honest to a man, but that so much thought has been, and is being devoted to this subject, that unconscious cerebration takes place among them, and they involuntarily, or even against their will, take each others' notions; details of bolt guns and fire-arms generally being in the air and infectious like the influenza. On this point, however, I am not, I will confess, psychologist enough to pronounce with certainty. But I must say, judging by results, it does not seem unlikely.

I now turn to the Mannlicher, of which the bolt and action alone with magazine attached, will illustrate better than could be done in any other way what I said a little while back about the length and weight necessary to every type of bolt, other than those which, like the one just described, take these bearings close up to the head. See what a mass of iron and steel we have here! The magazine is in principle the same as the one we have

just examined, but the bolt itself is, I will not say an entirely new departure, but differs widely from bolt guns in general, inasmuch as the usual method of locking it by a quarter turn is not resorted to; the bolt draws straight out and is pushed straight home again.

It was a serious accident with a gun of this very sort, if I remember rightly, that intensified, in the early days of breech-loaders, the English dislike of bolt guns, and for so many years deferred their introduction into this country; though probably the principles of the two weapons have little else in common. Here the security against accident is ample; the head of the firing pin is protected against an accidental blow when loading, the rise and fall of the hinged abutment-piece is mechanically certain, and until it is down in its place and entirely secure there, the firing pin cannot reach the cap with force to explode it.

The inventor, however, for the sake of securing a motion different from those of his competitors, has sacrificed one of the most valuable features of the bolt system. I mean the powerful cam action by which, in all other guns, the cartridge is started for a short distance in the chamber before being finally withdrawn by the bolt. This action is so powerful that it scarcely makes itself felt by the firer, except in the case of a very bad stick indeed; but if you will put a tight cartridge into the chamber of a gun not having the action you will, I think, be astonished at the force which will now be required to withdraw it by the mere pull of the bolt, and will understand stories you have heard, of men in action, unable to get these guns open from the sticking of the cartridge, being forced to place the butts of their muskets on the ground, and stamp on the handles; and even were this not the case, what does Mr. Mannlicher gain by this pattern of gun beyond a claim to originality? The motion of the bolt cannot be made in less time, nor can the magazine be emptied without taking the gun down from the shoulder any better than can be done with other bolt guns, that is to say, it cannot be done at all.

The guns adopted in Germany, Austria, and Belgium are of good Continental type, and though they would hardly come up to our own requirements, will, no doubt, do admirable service in the hands of those who carry them. They have one fault in common with the French, and almost every other type of bolt gun, an immensely long pull off, so that when pulling the trigger it is almost impossible to say at what precise instant the gun will go off, and the action I hold in my hand has besides a sort of double motion from the plan on which the trigger is constructed. The first pull brings a fulcrum to its bearings, then leverage is exerted and the catch which holds the firing pin is gradually withdrawn, and by-and-by the cartridge explodes. We, ourselves, should not be satisfied with this, and I must say that the pull off of our own gun is all that can be desired.

I should like to have shown you to-day the Mauser gun to which I have before alluded, the weapon now carried by the Turks and Belgians in Europe, and the Argentines over the water. I had one placed at my disposal for the purpose, but it was unfortunately abroad, and there has not been sufficient time to get it home. What I have said as to the placing of the locking projections on the front instead of the rear of the German and

Mannlicher bolts applies also to the Mauser, and his bolt, as I think I said before, is turned out to a greater extent than the Mannlicher. He secures a mainspring of larger diameter it is true, but he only does so by a loss of strength in his bolt which I should be the last to approve. Of course, with the best of materials, the most perfect workmanship, and fair usage, such a bolt will answer every purpose and last for ever, but the soldier's gun should have a larger *margin of safety*, as it is called, than almost any other bit of mechanism known.

Neither teaching nor experience will persuade some folks that a soldier's rifle may not with advantage serve as a pike or even a spade handle, while half the world believes that at close quarters it is used as a club as a matter of course. Those who best know the truth of the matter are aware that in camp and in the field, and even still more at sea, guns get an amount of knocking about which it is a wonder they stand at all, and which severely taxes the very best of them.

One very important feature of the Mauser as compared with the Mannlicher I have forgotten to mention: it is this. Whereas the Mannlicher carries its cartridges in a clip which, with the cartridges, is forced into the magazine and drops out through the bottom of the magazine when empty, the Mauser also has a clip, but of extremely simple form, consisting indeed of nothing but a strip of thin steel turned over at the two edges, into which the cartridge heads slide and where they are retained by a bit of ribbon steel acting as a spring. This clip is placed over the mouth of the magazine, which is in the Lee position, and the cartridges are forced out of it and into the magazine with the thumb. Once there they are retained in place by the overhanging sides of the magazine itself, which, being made of sheet metal, has its sides so cut into as to form a couple of springs, which are strong enough to hold the ammunition against rising vertically by the force of the feed spring underneath it, but not strong enough to prevent the cartridges from being forced out of it longitudinally one by one by the action of the bolt.

This being so, it is easy to keep the magazine full by adding a fresh cartridge by hand when one has been fired, and thus always maintain a reserve of four; this gun, therefore, used in this way, has the properties of our own in everything but the number of cartridges in reserve—four as against ten.

It is a quicker gun than ours when all the firing is done from the magazine, as it is proposed should be done, and it has the advantage over the Mannlicher just pointed out, viz., that the magazine can be replenished without having had to be first emptied.

The weapon of the French army, the famous Lebel gun, is nothing more nor less than the Kropatchek repeater, which has been for many years in use in their navy. It has the modified Chassepôt, or Gras bolt, and the spoon elevator common to all guns of that class; the sole change that has been made—so far as I know—in the mechanism, is a small stud or projection placed under the point of the spoon, which, when the latter is raised to conduct a cartridge into the gun, acts as a stop, and prevents a second cartridge from setting outside of the rear end of the magazine tube, and so jamming the action.

The faults of this system are known to you, I think, already. The danger of the long column of loaded cartridges bullet to cap has been minimized, as far as possible, by the introduction of a second, or safety cap, which, when driven in by the pointed striker, will produce an explosion of the cap proper; but may be driven in by a rounded surface, like that of a bullet, without doing so. The weapon has been re-christened partly, because it now carries the Lebel cartridge, which is said to produce an initial velocity of over 2000 feet per second. Partly, also, I should imagine because it is easier to say Lebel than Kropatchek, and, besides, sounds more patriotic.

Their satisfaction with this gun has, not, however, prevented them from following the Austrian initiative in the new weapon proposed for the use of their cavalry. This is a gun having the Lee magazine and the clip system of feed. Oddly enough, however, they have gone a step further than the Italians have done, and place but three cartridges in their clips. This, of course, all but does away with any serious idea of cartridge reserve, and is merely a quick and convenient method of loading.

The Italian or Vitali gun is a conversion of the large bore single loading Vitali formerly in the service. A Lee magazine has been added, into which four rounds are fed from the clip or holder in which they are issued. The gun is a clumsy looking affair, and I am unable to give you any particulars regarding its ammunition.

The Russians will retain, I believe, for the present, their little Berdan bolt gun. They have proved to their own satisfaction, or at least to the maintenance of the confidence of their soldiers, that they are better off with the Berdan than they would be with any repeater; and to a certain extent this is, no doubt, true.*

Any advance made in the arm itself which in even the smallest way complicates its operations or renders its use more difficult will demand in a greater degree an increased intelligence in the soldier. And it is somewhat doubtful, not whether the *élite* of the Russian army is ready for the magazine gun—that they are fit to be entrusted with any weapon goes without saying—but whether it would be advisable to introduce a superior weapon at the cost of many millions of money for the use of the armed but unintelligent peasantry who form so large a portion of their forces.

We have now in a general way disposed of the arms of Austria, France, Germany, Belgium, Italy and Turkey, in Europe, and the Argentines in South America.

In the United States the Lee gun has long been issued to the navy, where they consider repeating fire-arms to be even more necessary than on land. With regard to their troops they still carry, I believe, the old Springfield musket, which, in spite of much abuse and many attempts to displace it, has done good and useful service. You are all, of course, familiar with the gun: made on the principle of the Belgian Albini-Braendlin, it has yet a singularly American look about it.

Of course the Americans have their eyes open as to what is going on

* Since I wrote the above, it has been announced that the Russian Government is about to adopt a new rifle. Their re-armament will, however, take at least three years to effect.—G. V. F.

here, and they will, no doubt, as in the case of their big guns and big ships, allow Europe to have the expense and trouble of experiments, and when the proper time comes embody the results.

I have visited on several occasions the Springfield Arsenal, where these guns are made, and through the kindness of Colonel Buffington was able to see the whole course of manufacture. Some of the appliances are very beautiful, and there are some things done there which we might learn to do with advantage. For instance, the drop forging, as it is called, of considerable-sized pieces of iron and steel. The forge fires, in which air charged with the vapor of petroleum is burned instead of coal or gas, where no scale whatever is formed on the iron and steel heated for forging or welding, where there is no waste and no damaged metal; the blueing of the musket barrels, which is effected by plunging them for a few minutes in a bath; a press in which the whole side of a field-gun carriage was formed from a steel plate in dies at a single operation; a press in which rings for carbines were formed cold, and bayonet sockets squeezed up to fit smaller barrels, the steel flowing under the enormous pressure like lead.

In making fire-arms, revolvers, or machine-guns, I fear we have still a good deal to learn from America.

In any case, as is well known, it is in this country sufficient that a man be an American for him to have attention in matters of small arms, seldom conceded to the domestic inventor. We owe the Sharpe carbine, the Colt's pistol, the Snider rifle, the Gatling, Gardner and Maxim machine-guns, and the Hotchkiss quick-firing cannon entirely to that ingenious nation beyond the Atlantic. Americans have invented these admirable weapons, and created machinery for their production, and American workmen have taught us how to use it.

We are now adopting as our national weapon another little foreigner of the same birth and parentage, but if it only serves our purpose as well as its predecessors have done, we shall probably none of us complain that it was not produced somewhere near home, much as we might have liked to see it so, and here it is.

This rifle which I hold in my hand is the now well-known Mark I, one of the first batch issued to our troops; for all the practical purposes an exact reproduction of the rifle approved by the Committee and sealed at the War Office to govern manufacture.

This is the rifle which has caused so much discussion and been credited with almost every fault it is well possible for an arm to possess.

I will not say that such of the writers and speakers as really understood their subject had not good cause for some solicitude or even alarm *from their point of view*, which was that every fault discovered in the guns first issued necessarily meant a permanent defect in the chosen weapon of the empire. If a mainspring broke or a bolt head came off, a cartridge jammed or a magazine spring weakened, they argued that such accidents involved some grave error in first principles, and called out that it were better at once to abandon so faulty a gun.

I am not at all sorry that this view was taken or that such adversaries as entered the list against it *honestly* were of such weight and influence, and

spoke and wrote so powerfully and well, that the authorities were induced to reconsider some points they had thought permanently settled, to relax somewhat the Medo-Persic conditions that surround and protect their sealed patterns, and admit that even at this early stage of proceedings Mark II might be made to succeed Mark I with advantage to the gun and the country.

They have thus done us a signal service, and one for which without them we might have waited for years.

I do not hesitate to say, however, that had they not wisely refrained from continuing the attack after winning their first battle, had they succeeded in arousing the fears of the country and stopping the manufacture of the weapon, they would have left us practically without arms of modern type for two years at the very least, and perhaps landed us in some grave national misfortune.

The reports of the Committee who selected and superintended the improvement and testing of the gun are not accessible to outsiders like myself; but it is known that a typical Mark I has fired 10,000 rounds and remained good and serviceable; that it has lain for a month out of doors in wet and wintry weather, and, rusted as it was, been worked and fired with success; that it has stood the tests of sand and acids, ill usage, and damaged ammunition, in a way to prove its fitness to resist more complicated misfortunes than could possibly be the lot of any single gun under any circumstances whatever. Perhaps some objector will say, as indeed I heard said the other day, that its mechanical principles are all wrong. To which I reply, then so much the worse for the mechanical principles; if, indeed, they are really concerned in the matter at all, which I am somewhat indisposed to admit.

Some wire may not be bent into the most effective shapes, a set screw might with advantage be replaced by a better contrivance, but I maintain that there can be nothing very radically wrong in a gun which will stand triumphantly the tremendous tests to which this very Mark I has been subjected, and in which it has beaten every competitor. Mark II will, among other things, be lighter, which is a great gain. It will not have a locking bolt, which is a matter of but little importance, as it can be cocked or have its firing piece let down by hand. It will, I hope, retain the dust cover and the long-range sights, which, by-the-by, I should like to see placed on the right side of the gun; but Mark II, when first issued, though an improvement on Mark I, will yet not be the perfect weapon which Marks V or VI may confidently be expected to become, when we arrive at that stage of the matter later on.

I should much like to have been able to exhibit here a certified sample of Mark II, in order that you might have been able to compare it for yourselves with Mark I, but that being impossible, I have an uncertified copy which you may take as being a very close representation of the real thing, of which but few have been yet made, and which is said to be still in the experimental or unsealed stage. You will easily see most of the changes that have been made, but would hardly notice one of them which, with the general lightening of the weapon and the adoption of a better attachment

for the bolt-head, form the three great advantages obtained for us by the criticism above alluded to. This is the change in the magazine, which, slightly broader than before, is also slightly shallower, and contains ten cartridges instead of eight. We must remember that these are a first installment only of the improvements we shall get by-and-by. Nothing very startling to look at, I daresay, no change whatever in principle, but little subtractions and additions to the parts; small changes of form which add to the smoothness and certainty of their workings, and remedy the minor faults which come to light in every-day work and as we get to know the weapon better.

But why, you would ask, if there is a single fault remaining, is the rifle issued? Why, when the specimen of which you speak has stood such terribly severe tests with success, are we to find, the moment the issue of these arms commences, a number of accidents occurring, which would have been sufficient to disqualify the original rifle from further competition?

To the first question, the reply is easy. Had absolute perfection been insisted on, you would never have got a rifle at all. The very best gun is but the result of a series of compromises; and it is only from experiences gained by having a large number of rifles in all sorts of hands that every fault can be detected for future remedy.

To the second, the conditions under which the trial rifles were produced were totally and essentially different from those which attended the manufacture of Mark I. They were produced by the most highly skilled workmen slowly, a bit at a time, under the eye of the inventor. Their springs were tested and re-tested, any weak portion renewed or remodeled, and so to speak, they were nursed into existence. But when once the type had passed its tests, obtained its diploma, and been furnished as a model for 100,000 exactly similar guns, a totally new set of conditions came in. A new set of men took the matter in hand, and other means had to be used for the making of every bit of them. The problem now came up for the first time for solution, how to deal with many tons of steel in such a way as to best make them into bolts, the shoes, the barrels, the guards, and bands of these new guns; what metal shall we draw into wire and of what diameter, and how shall we coil and temper it wholesale, so as to make a mile or so of it into mainsprings—and mainsprings, too, which, while of smaller diameter than usual, will yet work smoothly and evenly, and neither lose their elasticity with constant wear nor snap on a sudden strain either at 150° above or at 40° below zero. Moreover, none of this is work which can be performed off-hand in either the best or the cheapest way.

During the whole course of manufacture, constant little ways by which one operation may be made to take the place of two will occur, a third perhaps being dispensed with altogether, so that by-the-by, and in the natural course of things, the next issue of guns will be found to be better made and cheaper than the present.

As to the mainsprings, the coiling and tempering of wire springs is a trade by itself, and a trade, too, which, more than any other, has its secrets. It is exercised in England by one firm almost exclusively, so far as the

best springs are concerned. And there lives in Belgium a little workman of my acquaintance who, from having a small shop when I first met him, and working for his neighbors, has arrived at a large factory, and works for every government. He keeps the key of the tempering shop himself, and no one but he ever enters it or works there.

And yet our arms manufactory is expected to do at a moment's notice, and without a single failure, what it has taken this man a lifetime to learn, and what he himself could not do off-hand, and without serious consideration of all the conditions, and of the material it would be wisest to employ.

Is this quite reasonable? Does nobody recollect the early days of the Martini? How mainsprings broke up like glass; how irresponsible persons proved, to their own satisfaction, that the motions of the rifle violated every known law of mechanics; and how learned professors were engaged on either side in a controversy which seemed never ending? But one fine day we woke up to find, to our astonishment, what all the rest of the world already knew very well, that we had in our hand the most powerful far-reaching and deadly soldier's gun in existence, which, from Mark I progressed to Mark VI, I believe, in our own factories, and was still further improved for the Roumanian Government by the celebrated Austrian manufacturer, Herr Werndl, of Steyer—the story of which, as showing what can be done with fire-arms, is worth repeating.

The Roumanians, who not then being the manufacturers of ammunition, and knowing that—specially in their fortified places—they might have to use the empty shells over and over again, adopted the Gatling-Gardner solid-drawn case: and extraction also being the weak point of the Martini, resolved to meet both conditions by a single order to the inspectors charged with the reception of their rifles. They determined the exact size of chamber into which the cartridge they had chosen would expand and again recover itself; and they gave the order "*Point de tolérance*," "no allowance," which practically meant that a deviation of a thousandth of an inch from these proportions would condemn the gun.

The large German firm which had taken their contract with a light heart was promptly ruined, as might have been expected, and closed their doors. At this point Herr Werndl stepped in, undertook and fulfilled the contract under these onerous conditions, and made the Roumanian Martini the best specimen of the gun in existence.

I once had three of these rifles, and the fired shells would fit indifferently the chambers of all three without re-sizing, and in all the thousands of rounds I have fired with them, I never once had the very slightest difficulty in extraction.

I mentioned this fact once before, and the reply I then got was that the chambers may have been all right; but how about the cartridges, they could not have been all exactly to size? Probably not; but a cartridge if not exactly to gauge is always above and not below it. Owing to the wear of the dies, too much, not too little, difference between chamber and cartridge is what would produce a stick.

This said question of rigorous exactitude in the dimensions of the chamber is of the greatest importance to any rifle, more especially now when, as

in our own, higher pressures will be generated by the new explosives, and a cartridge be liable to be permanently set up in a chamber in the smallest degree over gauge, and cause endless trouble.

No doubt, however, attention is being given to this and other points which I need not here mention.

There is, however, one other subject which I should like to touch on before I conclude, viz., that of the bullet and the rifling. I introduced some eight years ago, as some of you I dare say know—a system of short rifling for sporting guns, which, rifled at the muzzle for about an inch only, carry ball with the accuracy of a rifle and fire shot as well as an ordinary gun.

A thousand barrels or more have now been made on this principle, and, as you will see from the target here, at the distance they are intended for, they shoot very well indeed, and the correctness of the principle here has been thoroughly vindicated.

I have here some casts of the muzzles of such guns 8 and 12 bore, and though we get but little increased velocity, as some would suppose, it is evident that a good deal of the work done in barrels rifled for their full length is dispensed with. This for arms of these large calibres is a matter of but little importance, and forms no part of the reason for making them, but when we employ such diminutive tubes as this of which I have here a cast, in which the bullet has to perform three distinct turns on its axis accompanied by a vast amount of friction, it does seem to me that it would be worth while to ascertain whether a few inches of rifling, in which a little angular displacement only would be required, might not serve as good a purpose, and whether in such a case a simple hardened bullet might not be employed, and some £75,000 per annum be saved to the country, which sum represents about the cost of the nickel-copper envelopes which will be fired away year by year in our annual practice.*

To return, however, having thus far spoken of the arms which I have undertaken to examine and describe, I will now, if you please, proceed to compare them, one with another, and see whether in the adoption of this new rifle, we can be said to have abandoned or maintained our position as to small arms, which in the days of the Martini-Henry was at the very top of the list, *facile principes* we then were in this matter, beyond doubt or cavil.

It is interesting to note in the German rifle what advantage has been taken of the forward position of the locking wings on the bolt to lighten away everything behind that point. Even the magazine is of extremely thin steel, but it is brought up to the requisite degree of strength by these ribs which you see on each side of it, and which also reinforce the trigger-guard, itself but a thin ribbon of metal.

The Austrian is the heaviest of the four guns more immediately under consideration, being more than 9½ lbs. in weight; and I think you will agree with me that a soldier's gun should not exceed 9 lbs. in weight, or with bayonet fixed 10 lbs.

*The late Captain O'Hea many years ago advocated what he termed "part-rifling," and though he was successful in some experiments, for some reason the thing fell to the ground. My construction is somewhat different from his.

Mark II will be well under these weights; but here we come to a strange divergence of opinion, as evidenced by the present state of the bayonet question; the German gun, with bayonet fixed, being no less than 13.4 inches longer than our own, and the French 10.1 inches; perhaps if we had put it the other way, the statement would have explained itself. The French have retained the long bayonet of the Kropatchek, now a very old gun; and the Germans are minded in this matter to over-reach them.

The Austrians, on the other hand, have shortened their bayonets even more than ourselves; and whereas their rifle is an inch longer than ours, the rifle and bayonet together are more than an inch shorter.

That any great combat will ever be decided by the fact that the bayonets on one side are 3 inches longer than those on the other, I must say I do not believe. Bayonets and rapiers are very different things; and the issue in the former case will not depend on the mere presence or absence of an inch or two of steel at the business end of them.

The bayonet push is a thing almost unheard of in war. The bayonet rush, as a rule, decides the weaker nerves to go. Still all must carry them in some shape or another as long as any do. Imagine the continual annoyance troops would be subjected to were they known to carry no bayonets. They would be charged by everything that could ride, mounted infantry included, and all the world would be unduly anxious to come to close quarters with them. As this is so, no doubt a short handy bayonet is the best weapon to have at the end of one's gun for a single-handed fight with a savage sword or spearman (which now and then comes off), and interferes far less with the shooting of the rifle, which must always precede any such episode at close quarters.

With regard to the merits of the different rifles as single loaders so far as their mechanism is concerned, I should be disposed to place them much on a par one with the other. There may be a shade of preference for the German forward locking bolts, but these again have their disadvantages, the slots in which the lugs work are away out of sight and must form receptacles for a good deal of dirt, fouling, and rust which would not be easy to get rid of. Nor can the cartridge itself, should the head blow off, for instance, readily be got at and extracted as with us. There is, however, I think no doubt that the outer protective barrel is an advantage of considerable value.

The system looks well, but if report is to be believed there have been accidents, and grave accidents too, with this gun, as indeed will inevitably take place with a first issue. Only in Germany, the Press is not permitted as with us, to depreciate the weapons on which the safety of the Empire may depend, and such misadventures as I allude to only reach the ears of the most careful inquirer.

The Germans have found a great increase of accuracy with their new small-bore guns, and in consequence, have diminished the size of the objects aimed at, or increased their distance.

That we have not the same improvement to note, as some folks are disappointed to find we have not, is entirely the fault of our last Committee on small arms but one, which in the Martini-Henry gave us a small arm as accurate as it is, I believe, possible to make one by machinery and in large

numbers. Our Martinis were far ahead of their Mausers in this particular, and if they have now come nearly up to the shooting of the Martini, as is possible, they will not be very far behind our own rifle.

If then these four guns, the Austrian, Belgian, German, and English rifles, as to weight, safety of construction, and accurate shooting are somewhat about on a par with one another—I omit the Lebel and Vitali, for on the accuracy of their shooting I have no information—the whole question of the merit of the arms of Europe will turn on the magazines attached to them, which are indeed their *raison d'être*, and on the uses to which they will be put. And here I do not hesitate for a moment to say that I consider our own system so vastly superior, as to place our guns far and away ahead of all the others. We agree with the French, that the thing to be sought for is not a trifling acceleration of fire above that of the single loader for ordinary occasions, as all the others seem to believe; but a certain and reliable store of strength with which to meet the extraordinary occasions which specially in modern war are certain to arise, and equally certain, should we or our weapons be found wanting, to overwhelm us.

The French provide against their moment of necessity nine cartridges arranged in a tube under the barrel of the Lebel, easy enough to empty, but difficult and tedious to refill.

We provide ten rounds in a centrally placed detachable magazine which can in five seconds, when these are expended, be replaced by a full one carried in pouch, and we have thus a reserve for emergencies of twenty rounds. What more will any one say he wants?

Yet even so usually good a judge of things military as Mr. Archibald Forbes cannot help turning out of his way in his recent, somewhat fanciful article, on the "Warfare of the Future," to sneer at what he calls the Lee-Speed, and deny its right to the confidence of the soldier.

I venture to assert, on the contrary, that no soldier to-day carries a small-arm that when the first difficulties of manufacture, *en gros*, shall have been overcome, will make a more magnificent record as a weapon of war, and that the first fighting that shall occur—and allow a fair comparison to be made between the arms we have examined to-day (not at the desk or on the rifle range, but in the camp and the field), will justify, and more than justify, the position I have taken regarding it.

Inventors, whose disappointments have introduced so much bitterness into this controversy, but whose complaints have rather taken the form of carping at minor details and remediable faults, than of any bolder challenge of the rifle on general principles, must be contented, for a time, at least, to find their occupation gone. The choice we have made is, for the moment, final; we shall retain, though we may improve, our rifle, until such time as the march of science again calls, as it did nine years ago, for something more rapid in its action, more far-reaching, or more deadly. But to-day, no system exists so good as our own, and though in several weapons there may be trifling advantages of construction, there is absolutely nothing which would make it even good policy—to say nothing of economy—to reject the machinery set up for the production of our gun or recommend the exhaustive trials which could only justify, at the end of two years or so, the adoption of a

new one. The probabilities are that, as we can now fire forty rounds in a minute from the shoulder, and 650 from the machine-gun, we shall not move again till the possibility of much exceeding these results is demonstrated, or the means of obtaining them made easier.

Whether we shall then take up the left hand motion of Gardner and Spencer, use the recoil to do our work as does Maxim, or incline to listen to an inventor whom I met in New York who first filled his gun with ammunition, and then wound it up like a clock, I don't at all know.

For preference, I should say that some variety of Maxim's principle, wedded to the electric cartridge of Pieper or Day, will stand as good a chance as any.

I shall, probably, however, not live to see it, or again feel myself called upon—as I did when I last appeared in this theatre—to urge you to change the rifles of the English army for something newer and better, lest in the great race of progress you should one day find yourselves either distanced or left behind, and be made to suffer accordingly. For the present you may rest satisfied to know that our soldiers of to-day hold in their hands the best military small-arm in existence.

THE PROGRESS OF TACTICS FROM 1859 TO 1890, AND THE ATTACK OF THE FUTURE.*

By MAJOR-GENERAL VON BOGUSLAWSKI.

From the German.

By CAPTAIN GAWNE, FIRST ROYAL LANCASTER REGIMENT.

(*The United Service Magazine, London.*)

EVERY endeavor must be made to retain troops, despite artillery fire in as close order as possible up to the moment they become engaged. Even before the latest improvements in artillery, company columns were generally used, and they had frequently to adopt linear formations. The deployment of troops in skirmishing lines to lessen the effect of artillery fire would disperse them before entering their own sphere of action. Infantry incapable of moving in line formation under fire had best be disbanded. It will, however, stand this ordeal if imbued with that solidarity common to all good troops skilfully led.

The regulations enjoin as a general rule the use of deep formations in battle—the distribution of troops being in accordance with such formations. The fight is fed by the firing line, which has numerous small supports. In the attack the firing line advances by rushes; or, if the cover be favorable, in quick time. It is reinforced by its reserves in close order, or by larger bodies of troops following as second and third lines. The strength of the final reserves depends on the obstinacy of the defense. When the assault

* Continued from JOURNAL, No. 56.

is to be made the *échelons* in close order approach the firing line, and then charge, carrying it with them. The charge must be made with the greatest energy, and in a single rush.

Rightly, however, the regulations state that it is permissible for the firing line to charge without waiting for the impetus which the arrival of the troops in close order will give. And in fact this will be a very frequent form of the assault, arising from the independent action of the officers in the firing line.

Although exception may be taken to this principle, there can be no doubt that, before making the assault, troops, still in close order, must be brought up into the firing line. The regulations justly point out the value of flanking or encircling attacks, and that the fate of the battle lies in the firing line, so that there is no chance of success without decided superiority there. For this reason the assault is, and always must be, an indispensable part of the attack. The tacticians who would, however, decide the battle by fire alone, followed perhaps by a half-hearted charge, would make a great and serious mistake.

The precept is laid down by the regulations that if an attack is well pushed home the enemy will never stop to cross bayonets.

Grave doubts have been expressed, however, whether, taking into consideration the latest changes in armament, the general principles of the regulation attack are sound. The pith of their argument may be summed up as follows:

1. Greater accuracy of fire, particularly as regards artillery, has rendered the commencement of the attack more difficult.
2. Greater intervals are necessitated by the increased range and flatter trajectory of the rifle.
3. Deep fighting formations are inadvisable, since the rear *échelons* suffer very severely from unaimed fire; and not being brought into action, they are of little use. Broad skirmishing lines should therefore be used from the outset, the general idea being to outflank the enemy.
4. The decision of the battle is to be left to fire action and flank attacks.
5. The principle of approaching the enemy as closely as possible before opening fire is condemned. Greater advantage should be taken of the long range of the rifle.

I have already expressed an opinion on the first paragraph.

Taken as a whole, the second paragraph may be agreed to, as regards the distance of rear *échelons* from the firing line.

The greater range of the rifle creates a greater "dangerous zone," and consequently causes more indirect hits. Immediately after 1870 I asserted that supporting troops, consistently with tactical demands, should be as far to the rear of the firing line as possible, and have, therefore, now little hesitation in pronouncing in favor of greater intervals. In a delaying action and the preliminary phases of the attack, supports and *échelons* in rear of them must, unless cover exists, be further in rear than formerly. Consequent on this is the further deduction that the firing line must be dense, so as to be able to sustain the fight for some time, and must be supported in

every way. To do this, the supports and first line must be pushed up closer to the firing line at critical phases. Troops must and can be trained to endure fire passively without shooting their comrades in the back.

No doubt, as was lately pointed out, owing to the increased breadth of the dangerous zone, the reinforcement of the firing line has been made much more difficult, and this difficulty must be decreased by reinforcing at the double.

Regarding paragraphs 3 and 4, there is no doubt that an unskilled and exaggerated application of their principle unduly weakens fire action.

Even within my own experience there have been situations where the soundest tactics were the immediate deployment of all available troops in the firing line, to deceive the enemy as to our numbers. The late improvements in rifles have increased the power of the firing line, both in defense and in attack. It is also easier than formerly to deceive or "contain" the enemy. I cannot, however, agree with those who hold that, when forces are even fairly equal, the soundest and boldest tactics are the immediate deployment of long lines, with the object of extending beyond, and out-flanking the enemy's front. They say, "There is nothing new in our ideas, and the new rifles have made envelopment much easier."

But it must be self-evident that even in great battles there are limits to excessive deployment. Given a battle in which there are 200,000 infantry on either side, to what extent would you deploy? Of course the advocates of deployment know that in any case there would have to be great reserves; but even deducting these, if each battalion deployed as they suggest, the battle front would be absurdly extended.

Envelopment can only be attempted when local circumstances favor your infantry. At Sedan we certainly surrounded and compelled to surrender an army of 134,000 with one of 168,000. But here, apart from the extraordinary genius of our leaders, we were favored by two circumstances. The first was the Meuse covering a large extent of our line, the second our great superiority in artillery, which elsewhere had been almost balanced by the superiority of the chassepot. Here, however, the enveloping position gave peculiar scope to the artillery fire. We cannot, however, always have a Meuse, always be confronted by vacillating generalship, nor have we now the superiority in weapons we had then.

There is another very grave objection to this excessive deployment of the infantry.

In 1866, as may be easily believed, we never ran out of ammunition. In 1870, however, we came to the end of our cartridges again and again. It is therefore humanly probable, that despite the greater number of rounds carried by the soldier, in the wars of the future this exhaustion will be even still more frequent.

Neither fire discipline—which, in battle, even with the best of troops nearly vanishes—nor any arrangements we may make for bringing up ammunition can entirely guard against the exhaustion of ammunition. The battalion ammunition-carts can accompany us up to within a few thousand metres; but you cannot reckon on the ammunition columns. It is only in defensive positions that these last can be brought close up. But, says some

one, the reserve ammunition from the carts should be distributed among the men before going into action. A very good idea if the fight comes off that day. But suppose it does not. Then the men will have more ammunition than they can carry, and it is impossible to say how many will make away with their rounds before getting back to the carts. The orders direct the battalion-carts, after distributing their cartridges, to drive back and refill. Evidently this operation is very tedious, and it is highly unlikely that the carts will be able to make the journey to and from the ammunition trains in one day.

Even supposing the cart ammunition to have been distributed, the supposition is only theoretical that the battalions have now sufficient rounds for a one day's battle.

If they have not, the fire will then begin to slacken, and if a bold enemy, seizing this moment, makes a determined counter-attack, he will, despite the repeaters, shatter our long thin lines. Let the advocates of these linear tactics recall their war experiences, the mutual attacks and counter-attacks at Woerth, Spicheren, and on the Mance—the irregular ebb and flow of these battles. Such sudden and unexpected counter-attacks, if made, will always be effective, for should the ammunition of the first line be exhausted the counter-attack can only be successfully guarded against by the supports of the second or third line. The deep fighting formation cannot, therefore, as many propose, be discarded. Napoleon's oft-quoted words, "*Le feu est tout, le reste est peu*," refers to the repulse of cavalry charges. They may now, however, be applied to all phases of the battle, but the bayonet still counts for something. Let us train our officers to watch for the slackening of the enemy's fire, for this is the critical moment in the present fighting tactics where the bayonet should be brought into play.

The fifth proposition advocates the use of long-range fire even in the attack. The arguments used to enforce it are certainly very seductive, and would almost convict their adversaries of false logic, did they not invariably ignore the effects of battle and of danger on human nerves. On the introduction of the self-cocking mechanism into the German army, arguments were used against long-range fire, which have lost none of their force, except that "mass fire"* may now be commenced at a slightly greater range than then. It is hardly possible to prescribe exactly where this fire should commence. If the theatre of action be a plain, its range might well be 150-200 metres more than formerly, *i. e.*, 600 metres. You would, however, lose all control over the fight, which would also be very tedious and indecisive. A further attempt to decide the battle by a night attack would be extremely hazardous, despite the brilliant examples of Laon and Hochkirch. A night attack is just as likely to terminate in disastrous rout as success.

With long-range fire the area of dispersion is probably very great, covering a large extent of ground indeed, but seldom producing annihilating effects. The commencement of "mass fire" at 1000 metres in the attack also acts injuriously on *morale*. Individual dash is destroyed by the frequent halts, especially if the firing lasts longer than was intended. These

* The fire in the duel between the two firing lines, as distinct from other fire.

halts also cause far greater losses than an advance by rushes without firing up to effective range. The defense generally knows the ranges accurately; not so the attack. The long-range fire of the defense is therefore more effective than that of the attack. To the loss of the latter in dead and wounded must also be added the skulkers you find in every army. Short halts and as continuous an advance as possible is the best way of dealing with these gentry.

Frequent bursts of fire prematurely exhaust ammunition, and economy in cartridges in the fight must therefore be insisted on. The frequent use of fire at distances over 700 metres opens the door to waste of ammunition. Our object should always be to bring about the crisis in the shortest possible time by suddenly opening a crushing fire. As a matter of fact, the fire phases of a battle are always very lengthy; introduce, however, long-range fire tactics, and they will be infinitely protracted, and we shall also lack the strength to carry us through the hand-to-hand fight, as well as the assault.

The partisans of the long-range theory ask, "What is the use of having a rifle carrying up to 3200 metres if you are not to use it at long ranges?" Now, if you insist on your rifle having extreme flatness of trajectory and the greatest possible penetration, the attribute of long range follows as a matter of course. Further, under certain circumstances, it may be necessary that the modern rifle should be effective at ranges of 1500-2000 metres. Such would be the case in the defense of positions, and still more in fortress warfare. Both here and at short ranges it would naturally create a bad impression on troops to find their rifles inferior in flatness of trajectory to those of the enemy. But it would indeed be false logic to deduce from these facts the conclusion that under all circumstances our troops should avail themselves of the tremendous range of their rifle. In the battle a great many other factors have to be reckoned with. Only remember how inferior the troops are which in future every army will have to bring into the field, and you will realize how just is the demand for fire tactics which shall prevent waste of ammunition and maintain a high standard of *morale*.

Long-range fire can certainly be employed against favorable targets, but only from a defensive position.

Due consideration being, however, given to it, the attack will be somewhat as follows:—

Assume, first, that the enemy's artillery has been successfully silenced, those guns which have survived the artillery duel will shell the enemy's infantry.

The deployment preceding an attack in the open will differ only from its predecessor in the distances between lines being greater; the choice of column or line being left to the discretion of the leader.

To deploy in sufficient strength at once must be a recognized principle. Great care must be taken to guard the independence of each leader, even to the zug leader, since the zug is the fire unit. Some body of troops in the centre of the line should be named to give the general dressing and the point of direction.

At a considerable distance from the enemy the firing line will commence

advancing by rushes; these being longer than formerly, the fatigue attending them increases in due proportion. Valises should, therefore, generally be taken off before making an attack.

Should the position allow of a flank being turned, the troops detailed for this duty must receive their instructions while at a fitting distance from the enemy. If they succeed in gaining a point from whence the position can be partially enfiladed, fire may be opened at distances over 600 metres.

In a frontal attack over an open plain troops will advance to about 600 metres before opening fire. Thence the advance will be by rushes, supported by fire. The last few hundred yards would be best traversed by a simultaneous advance of the entire firing line at the double. Once troops have come under direct fire, it will be found impossible to direct their rifles obliquely or anywhere but straight to the front.

Previous to the charge, fresh troops must often be pushed into the firing line, which will generally require the impetus of the onward rush of these reinforcements to drive it forward.

In the practice of the attack, especially on the barrack-square, great attention should be paid to cohesion, unity, and accurate drill; the most necessary of these three requisites in war is unity of action.

In peace, as in war, our most difficult task is the art of combining this unity while preserving the necessary independence of the subordinate leaders. An attack in the open clearly permits of less scope for independence than on the barrack-square.

But excellent as are the directions on this subject, they are often construed wrongly, and orders consequently betray indecision. One leader often fails to cut himself quite clear from the old ideas, and interferes too much with his subordinates; another believes any interference with his subordinates, after giving them their instructions, a mistake. Certainly long orders are a mistake when it is only necessary to give the point of direction to the leading troops. On the other hand, attacks may be frequently seen, which are, from want of clear orders, opposed to the regulations.

The same state of affairs prevails among the subordinate leaders. It is difficult for them to hold the just balance between independence and subordination.

I fully recognize, however, the value of allowing a free hand in the execution of the last stage of the attack. Still, it is worth while considering whether the average leader would not find precise instructions advantageous, and whether such curtailment of independence would in any way prevent alterations rendered necessary by either the peculiarities of the situation or the ground. Such instructions should, though highly elastic, exist.

With regard to the assault, close or point-blank ranges have been increased to 600 metres by the introduction of small-bore rifles; but, even if the double be used, a charge of 600 metres is an impossibility. No troops are capable of such an effort. In an attack in the open, the firing line will not be able to approach, even in rushes, nearer than 400 to 350 metres from the enemy. Rapid fire must then be brought into play. The reinforcements now close at hand will either strengthen the firing line or remain in

close order. The whole will then advance to the assault, but even without knapsacks troops cannot cover 400 metres at the double. So the "storm pace" must be used up to 100 metres, and then the double. An attempt, however, to traverse 400 metres without firing, in the face of even a demoralized enemy, would be asking too much of troops, and would most assuredly fail; the only way of keeping down the enemy's fire is by the troops firing as they advance. The effect of firing during movement has been greatly increased at short ranges owing to the excessive flatness of trajectory of the new rifles, the lightness of which assists snap-shooting greatly. Of course, on commencing to double the last 100 metres all firing must cease. This last stage of the assault should be executed with great dash and energy, which will be the case if the charge is properly practised. The proposed halt in the assault after the independent fire can only lead to defeat.

The leader of the troops attacking should reach the firing line before the charge. It is his duty to command the advance by rushes of the last reinforcements, the signal for independent fire, the advance at "storm-step"* and the charge.

In the defense I would gladly see a greater value placed on the practice of the counter-attack.

A frequent cause of the rupture of the bands of authority are the disproportionately strong advanced guards, the engagement of which influence powerfully the leader's designs. As a rule, advanced guards should be strong in cavalry, weak in infantry, and have a fair proportion of guns. Cavalry can easily fall back before a superior enemy, and their defeat is no great matter. If, however, a strong force of infantry becomes seriously engaged, support *must* be given, or the consequences may be grave.

You may then find yourself obliged to fight in a position you know to be unfavorable. Should, however, the infantry with the advanced guard be weak in numbers it can be withdrawn, or, if necessary, sacrificed.

Weak advanced guards are therefore advantageous, and their leaders must recognize their duties to be confined to those of reconnaissance, or at most to covering the deployment of the leading troops of the main body, on a very sudden appearance of the enemy.

Further, a leader, in fixing the strength of the advanced guard, must take into consideration the nature of the country his force is traversing. A strong advanced guard is of course necessary when an important point has to be reached quickly, but they are out of place when troops are marching across country, and may encounter the enemy at any moment, as at Königgrätz and Gravelotte. In such cases the best advanced guard is a few cavalry, and among them the divisional leader.

On the 3d July the 11th Division, making a march of nine miles to Königgrätz, had an advanced guard of a few cavalry and a single battalion.

Both the regulations and the field instructions lay great weight on the commencement of the action finding the commander with his leading troops. During the fight he is best posted with one of the rear échelons.

* Storm-step, a quickening of the march to 120 paces a minute. The *drums* also beat the storm.

but in any case his position should command the battle-field. The leader of attacking infantry must of course change his position with the phases of the attack.

Much has already been written on the merits and demerits of smokeless powder. It facilitates and impedes leadership equally. Though on the one hand powder smoke no longer obscures the view, on the other hand it no longer defines the enemy's position. Nor can the leader feel the pulse of the battle by observing the swaying and breaking of the lines of smoke. Shots strike, but you cannot see whence they come.

Gallopers, with orderlies, must keep close to the troops in action, in order to rapidly transmit reliable information to the commander. The plan of battle, especially as regards the employment of the reserves, cannot be determined till a later stage of the battle than formerly. It has changed neither the tactics nor effect of artillery or infantry. On the other hand, it has decreased the value of cavalry still more, since reconnaissance duties have certainly become more difficult, and, unhampered by smoke, infantry will repel cavalry attacks with a still more deadly fire.

Epitomizing these observations on infantry tactics, it appears:—

1. Neither the repeater, nor smokeless powder, nor yet the latest improvements in field artillery will cause any radical change in battle tactics. There is no ground for the theory that we must make a fresh start.*

2. The attack requires greater depth than formerly.

3. In the attack in the open it would be desirable to have a few general rules to avoid the dispersion of troops.

4. The soldier should not only be most carefully instructed in all his physical work, but those mental qualities of service in war should also be developed to their utmost.

6. Leaders, high and low, must study simplicity in giving or executing orders.

7. Simplicity in devising tactical exercises should also be studied.

Part of the elementary training of troops should be the mixing up of the firing lines of different tactical units, to practice men in the disorder of battle.

Finally, though no doubt fire rules the battle, sudden and timely bayonet charges are still valuable, and in the changing turmoil of the battle good infantry will never fail to prove it.

STAFF DUTY IN THE PENINSULAR WAR.

MEMOIRS OF BARON DE MARBOT.

Translated by CHARLOTTE HOPE COX.

MARBOT'S memoirs have created quite a *furor* in military circles in France. After lying in his family archives for half a century, they have very recently been given to the world, and have been received with an enthusiastic recognition, as fresh and authentic revelations of the French military character in the Napoleonic era.

Marbot (Marcellin) was the second son of a noble though untitled officer, who had been in the royal army of France, but remained in the service of the Revolution after 1789, and who commanded a division under Massena, dying during the siege of Genoa.

Young Marbot enlisted in a hussar regiment—the only way of entering the army at that time—and passed through the non-commissioned grades, getting his commission as a lieutenant for gallantry in the field. He served as aide to Bernadotte, Augereau, Lannes, Murat and Massena, till he became *chef d'escadron*. He then took command of the 23d Chasseurs and became colonel of that regiment for brilliant conduct in the Russian campaign. After Napoleon's fall he was in exile for a time, but was restored to his grade subsequently and ended his career as General of Division and Chief of Staff to the Duc d'Orleans, father of the present Comte de Paris.

The chapter selected as giving a taste of his quality, is one that relates his adventures in Spain, carrying dispatches from Marshal Lannes to the Emperor at a time when the barbarities of the guerilla warfare were at their height.

“And now we have come to one of the most terrible phases of my military career. Marshal Lannes had just won a great victory, and the following day, after having received the reports from all the generals, he dictated the bulletin of the battle which was to be sent to the Emperor by one of his officers. Now, as Napoleon habitually promoted any officer who brought him news of an important success, the marshals, on their part, gave these missions to those whom they wished to advance promptly. It was a sort of nomination by them which Napoleon never failed to make good. Marshal Lannes having done me the honor to assign to me the mission of informing the Emperor of the victory of Tudela, I could permit myself to dream of soon being commandant of squadron. But alas! I was to suffer many wounds before I obtained that rank.

“The main road from Bayonne to Madrid through Vitoria, Miranda del Ebro, Burgos and Aranda, is joined at Miranda by the road which leads to Saragossa via Lagrofio and Tudela. A road going from Tudela to Aranda across the mountains of Soria connects them and forms an immense triangle.

The Emperor had advanced from Burgos as far as Aranda during the time which had been employed by Marshal Lannes in marching on Tudela and there giving battle. It was therefore much shorter to join the Emperor by the direct route from Tudela to Aranda than to go back by Miranda del Ebro. But this last route had the immense advantage of being covered by French troops, while the other was full of Spanish fugitives who, having fled from the battle of Tudela, were hiding in the mountains of Soria. Meanwhile, as the Emperor had notified Marshal Lannes that he was moving Marshal Ney's corps from Aranda on Tudela through Soria; Lannes, who thought Ney but a short distance off and had sent, the day after the battle, a vanguard to communicate with him, believed that this combination would secure me against all attack as far as Aranda. So he ordered me to take the shortest route, that of Soria. I will acknowledge frankly that had it been left to my own choice I would have preferred taking the long detour through Miranda and Burgos. But the Marshal's orders being positive, how could I urge fears for my person in presence of a man, who, never dreading anything for himself, was equally rigorous with others?

"An aide-de-camp's service in Spain was terrible. Formerly, during the Revolution, the generals had their couriers—paid by the State—for carrying dispatches. But the Emperor, finding these men incapable of describing anything they had seen, changed the system and ordered that in the future, dispatches should be carried by aides-de-camp. All this was very well whilst we made war amongst kind-hearted Germans who would never have thought of attacking a Frenchman riding express. But the Spaniards made fierce war on all such, as the contents of our dispatches warned the insurgents of our army movements. I do not think I exaggerate in giving two hundred as the number of staff officers killed or captured during the Peninsular War, between 1808 and 1814. If the death of a mere courier was a misfortune, it was surely less than that of a promising officer who had to take the risks of a battle-field in addition to those of carrying dispatches. A great number of able men who well knew the duties, applied for this service, but the Emperor never consented.

"At the moment of my departure from Tudela, the good Colonel Saint-Mars, having ventured some remark to dissuade Marshal Lannes from sending me through the mountains, that great man replied: 'Bah! he will meet to-night the vanguard of Ney, whose troops are posted as far as the Imperial Camp at Aranda.' I could not argue against such a decision. I started, therefore, from Tudela on the 24th of November, at day-break, with a platoon of cavalry, and travelled as far as Tarazona without hindrance. This brought me to the entrance of the mountains. In this little village I found Lannes' advance guard whose commandant, not having any news of Marshal Ney, had sent a post of infantry six miles ahead towards Agreda, from which direction they expected the Marshal. But as this detachment found itself far separated from all support, it was ordered to withdraw and to reënter Tarazona, if the night passed without meeting any of Marshal Ney's videttes.

"After leaving Tarazona there are no more highways, but mountain paths, covered with boulders and fallen rock. The commander of our advance guard

had only infantry with him and a score of hussars from the 2d regiment (Chamborant). He ordered a troop horse to be given me and two orderlies and I continued my route in the brilliant moonlight. We had gone two or three miles when we heard several gun-shots, the bullets coming uncomfortably near. We could not see those who had just fired, as they were hidden among the rocks. A little further on we found the bodies of two French foot-soldiers, lately killed. They were entirely stripped, but their shakos were left near them and I could read their numbers on the plates, and so learned that these poor fellows belonged to one of Ney's regiments. Finally at some distance further on, we perceived, oh horrible sight! a young officer of the 10th Chasseurs, still in his uniform, nailed by the hands and feet to a barn door. His head hung down and they had built a little fire underneath him. Happily for him, his tortures were over—he was dead. But as the blood still flowed from his wounds it was evident that his murder had been recent and that his assassins could not be far off. So I took my sabre in my hand and my two hussars grasped their carbines.

"It was well that we were on our guard for a few moments after, seven or eight Spaniards, two of them mounted, opened fire on us from behind a thicket where they had crouched. None of us were wounded; our two hussars answered with their carbines and each killed an enemy, then drawing their sabres, they charged on the others. I would have liked to follow them but my horse having lost his shoes among the rough stones, limped so badly that I could not make him gallop. I was the more enraged as I feared that the hussars, led off in pursuit of the enemy, would be killed in some ambush. I called them for five minutes and at last heard the voice of one of them saying with a strong Alsatian accent. 'Oh, you brigands! Don't you know yet Chamborant's hussars—you will learn that they don't joke!' My soldiers had just beaten two more Spaniards, to wit, a Capuchin, mounted on the horse of the poor lieutenant of chasseurs whose cartridge box he had slung around his own neck, and a peasant on a mule which also carried the clothes of the poor foot-soldiers whom I had found dead. It was evident that we had captured the assassins. An order from the Emperor prescribed in form, to shoot on the spot any non-military Spaniards taken armed. What could we do else, with two brigands already wounded and who had just killed three Frenchmen in so barbarous a fashion? I pushed forward so as at least not to be witness of the execution and the hussars put the monk and the peasant to the sword, crying out 'Ah you don't know the Chamborants.'

"I could not comprehend how an officer of chasseurs and two infantrymen of Ney's corps could be so near Tarazona, if their regiments had not yet passed that point. But, probably these unfortunates, captured elsewhere, were being taken to Saragossa when the Spaniards who were conducting them, having received news of the defeat of their countrymen at Tudela, revenged themselves by massacring their prisoners.

"I continued on my way, but the outcome did not seem promising. At last after some hours' march, we perceived in plain sight a bivouac fire. It was that of the post detached from the French vanguard which I had left at Tarazona. The sub-lieutenant in command of this detachment not getting any news of Marshal Ney, was disposed to return to Tarazona at day-break,

as he had received such orders. He knew that we were only two short leagues from Agreda, but was ignorant as to whether French or Spanish troops occupied the town. I was therefore in great perplexity, for this detachment would move off in a few hours and if I should return with them, when there was perhaps only one league between me and Marshal Ney's advanced guard, it would prove but little courage on my part and perhaps merit the reproaches of Marshal Lannes. On the other hand, if Marshal Ney was still distant one or two days march, I should in all probability be massacred by the peasants in these mountains or by the straggling soldiers who had taken refuge there; and all the more likely as I should be obliged to travel alone. Indeed the two brave hussars who had accompanied me thus far, were under orders to return to Tarazona.

"No matter. I decided to push forward, but this settled, there was still a great difficulty to overcome, namely, to find a decent mount. There was no farm or village in this solitude where I could procure a horse. The one I had limped horribly, those of my hussars were worn out, and no one of the men could lend me his without being severely punished by his officer, for the rules were strict on this point. The horse belonging to the poor officer of chasseurs could not serve as it had received a ball in the leg during the combat. The only resource was the peasant's mule. She was a fine beast and belonged by right of capture to the two hussars who were counting on selling her in the regiment. Nevertheless, the good fellows did not hesitate to lend her to me and placed my saddle on her back. But the vicious beast, more accustomed to a pack than to being ridden, became so restive and stubborn that when I tried to leave the group of horses she began to kick, and it was plain she would never go alone! I was obliged to dismount or be thrown over some precipice near by.

"I then decided to go on foot and had already taken leave of the officer of the infantry—an excellent young man, Tassin by name, a graduate of the military school at Fontainebleau, where he had been very intimate with my poor brother Felix—when he ran after me, saying that he could not see me expose myself in this way, alone, and that although he had no orders for such a case and his improvised light infantry were all conscripts and almost wholly untrained, he wished to give me one, so that I should at least have a gun and some cartridges in case of attack. I accepted his offer, and it was arranged that I should send back the infantryman with Marshal Ney's corps.

"So I and my soldier began our march. He was a Norman, slow of speech and hiding a tricky nature under an apparent bonhomie. The Normans are generally brave. I had the proof of that when I commanded the 23d Chasseurs in which there were five or six hundred. Meanwhile, to find out how far I could count on this man, I talked with him on the road, asking if he would hold firm in case of an attack. But without saying yes or no, he replied, '*Dam!* we shall see what we see.' From which I concluded that in a moment of danger my new companion would be likely to want to see what was going on in the rear.

"The moon had just set, day had not begun to break, and the darkness was intense. We stumbled at every step over the great boulders with which

these mountain paths are strewn. The situation was a painful one, but I had hopes of meeting Ney's troops very shortly; a hope strengthened by having just found the bodies of some of his soldiers. I therefore advanced resolutely, listening, to beguile my *ennui*, to the Norman's tales of his country. At last dawn began to break, and I perceived the first houses of a large village—Agreda.

"I was amazed at finding no outpost, for this showed that not only were there no troops in occupation of the place, but that the army was a half day's journey from there, since the signposts indicated no other village nearer than 5 or 6 leagues, and it was not possible that the Marshal had camped in the mountains far from all dwellings. I kept very watchful, and before going farther stopped to examine the position.

"Situated in quite a large valley, Agreda is built at the foot of a high hill very steep on two sides. The southern slope which reaches the town is covered with extensive vineyards, the top bristles with great rocks, and the northern slope, at the bottom of which rushes a mountain torrent, is clothed with a heavy underbrush. We could see high mountains beyond, uncultivated and uninhabited. Agreda has one principal street through its entire length, from which branch narrow alleys leading to the peasants' vineyards. On entering the village I left these alleys and the hills on my right. Get this firmly in your mind, as it is most important to my story.

"Agreda was asleep—a favorable moment for passing through it. I still had a feeble hope that if I could reach the other end of the village, I might be able to perceive the camp-fire of Marshal Ney's vanguard. So I advanced with my sabre in hand, bidding my soldier to cock his gun. The main street was covered with a thick matting of damp leaves which the villagers had put there to decay for manure, so our steps made no noise, much to my relief.

"I walked down the middle of the street, my soldier on my right. But he, finding himself too conspicuous, kept sidling up to the houses, brushing against the walls, so as to be more out of sight in case of an attack, or so that he could more easily run into one of the side streets leading to the open country. This proved to me how little I could count on him. Nevertheless I said nothing.

"Day began to dawn. We passed through the entire street without meeting any one. I was just congratulating myself, when having reached the last houses, I found myself face to face with four royal Spanish cavalymen, sabre in hand. Under other circumstances, I would have taken these men for French gendarmes, their uniforms being identical. But the gendarmes do not march in the advance guard of an army. These men, therefore, could not belong to Marshal Ney's corps and I realized at once that they were enemies. I made an about-face instantly, but at the moment when my face was in the direction whence I had come, I saw a blade gleam within six inches of my nose. I threw my head back just as I received a sabre cut full in the forehead. I still carry the scar over my left brow. The one who had wounded me was the corporal of the carbineers, who having left his four men outside the town, had come to reconnoitre the village in search of enemies. This man, whom I had not met, probably because he was in some

one of the alleys while I was in the main street, was about to take it to re-join his comrades, when seeing me, had approached noiselessly on the thick carpeting of damp leaves. He was just going to split open my head from behind, when my sharp turn presented my face and I received the blow on the forehead.

"At the same instant the four cavalymen, who had not budged because they saw their corporal ready for me, came up at a trot and all five spurred upon me. I ran mechanically towards the houses on my right to put my back against the walls, ready for attack. But, by good luck, one of the narrow and steep alleys which climbed into the vineyards was close at hand. My infantryman had already gained it. I rushed into it also, the five soldiers following. Here at least they could not attack me all at once, for there was only room for the horses to go in single file. The corporal came on in front, the other four behind. Although my position was not so unfavorable as in the wide street where I could be surrounded, it was still terrible enough. The blood which gushed from my wound had entirely closed my left eye, and I felt that it would soon blind my right eye also. So I was obliged to hang my head towards my left shoulder and let the blood flow off on that side, to prevent being blinded. It was impossible for me to staunch it, being forced to defend myself against my enemy, who hacked at me unmercifully with his sabre. I parried his blows as best I could, all the while climbing backwards, after throwing off my scabbard and colback whose weight hindered me.

"Not daring to turn my head lest I should lose sight of my adversary, I called to the soldier whom I believed to be just behind me, to rest his gun on my shoulder and fire at the corporal; but not seeing the gun, I quickly turned my head, drawing back a step, and saw my rascally Norman tearing up the hill. The Spaniard redoubled his attack and seeing that he could not reach me, spurred on his horse who struck me several times, especially on the breast, with his hoofs. Fortunately it was not with much force as the ground constantly rising made the horse unsteady on his hind legs and each time that he reared I stuck his nose with my sabre, so that finally he was no longer inclined to dash against me.

"Then the exasperated corporal called to the soldier behind him: 'Take your carbine, I will stoop down, and do you finish this Frenchman over my shoulder.' I knew that that order was my death warrant. But as in order to execute it, the horseman had to sheathe his sword and unsling his carbine, and as during this time the corporal never stopped thrusting at me, I determined to attempt a desperate thing, which would either save my life or lose it. Fixing my eye on the Spaniard and reading in his that he was once more going to spur on his horse to reach me, I did not stir, but at the moment when his body descended towards me, I made one step aside, and bending a little, parried his thrust and plunged more than half the length of my blade into his left side. The corporal with a fearful cry fell backward on his horse and would have rolled to the ground had not the soldier who followed him sprung forward to catch him in his arms.

"The rapid movement had caused my dispatches to fall out of my pocket. I quickly picked them up and ran to the end of the alley, where the vine-

yards began. Then I turned round and saw the cavalymen gathered around their wounded officer, seemingly very much encumbered with him, as well as with their horses, in the narrow defile.

"This fight had taken place in less time than it takes to tell it. Seeing that for the moment at least, I was free of my enemies, I scrambled through the vines and reached the summit of the hill. Then I realized that it would be impossible for me to fulfil my mission to the Emperor at Aranda. So I resolved to return to Marshal Lannes, first going back to the place where I had left M. Tassin and his picket of infantry. I had no hopes of finding them there, but at any rate it was in the direction of the army which I had left the night before. I looked in vain for my soldier and could see nothing of him, but I did see something much more useful to me, a clear little brook. I stopped at it a moment and tearing off part of my shirt, made a compress which I bound to my wound with my handkerchief. The blood gushing from my forehead had stained the dispatches which I carried in my hand. But I didn't mind that, so troubled was I with my desperate position.

"The emotions of that troubled night, the march I had made on foot in my spurred boots through the boulders, the fight I had just gone through, the pain in my head, the blood which I had lost, all this had broken me down. I had had no food since I left Tudela, and here was nothing but water to revive me. I drank deep draughts of it and would have rested longer by the pretty spring if I had not perceived three of the Spaniards coming towards me through the vineyard paths. If they had had the good sense to dismount and take off their heavy boots, they would probably have caught me. But their horses could not pass between the vine stocks and clambered painfully through the narrow rocky paths. When they reached the upper end of the vineyard they could not climb farther, as they were stopped by the cliffs on which I had taken refuge.

"They rode along the base of these walls, parallel to me and at long range, demanding my surrender. Being soldiers they would treat me as a prisoner of war, whereas if the peasants should take me, they would undoubtedly cut my throat. This reasoning was just, and I acknowledge that if I had not had the dispatches for the Emperor I would have given myself up, as I was completely worn out. Meanwhile, wishing to preserve as far as possible the precious trust which the Marshal had confided to my valor, I continued to walk along without replying. Then the three carbineers taking their guns, opened fire on me. Their bullets hit the rocks at my feet, but not one reached me, as the distance was too great for the aim to be true. I was not troubled at this, but was frightened when I thought that the sound of the reports would bring the peasants, whom the rising sun called to their labors. I expected an attack from the savage mountaineers. This presentiment seemed about to be verified, for I perceived half a league off about a dozen men coming towards me down the valley path. They carried in their hands something which glistened in the sun. I did not doubt that these were peasants armed with their spades. I thought myself already lost and in my despair was going to let myself slide down the rocks on the north side of the hill, to descend into the stream, cross it as best I could, and hide myself

in some gully in the mountains which rose abruptly from the gorge. Then, if I was not discovered, I would take the road during the night and go towards Tarazona, if I had strength enough left.

"This project presented many chances of failure, but at any rate it was my last hope. I was about to put it in execution when I perceived that the three carbineers ceased firing and rode forward to reconnoitre the group which I took to be peasants. At their approach, the iron instruments which I believed were spades or mattocks were lowered, and I had the inexpressible delight of seeing a fire by platoon directed towards the Spaniards, who, wheeling about, galloped rapidly back to Agreda, although two of them appeared wounded. The new comers were French, then! And the happiness of deliverance giving me a little strength I descended, leaning on my sabre. The Frenchmen had seen me; they clambered up the steep hill and I found myself in the arms of the brave Lieut. Tassin. Let me name some of the events which led to my providential escape.

"The soldier who had abandoned me while I was engaged with the carbineers in the streets of Agreda, had promptly gained the vineyards, when bounding like a goat among the vines, ditches, rocks and hedges he ran in a short time the two leagues to the place where we had left M. Tassin's post. The detachment were about to take the road to Tarazona and were eating their soup, when my Norman, arriving all out of breath but not wishing to lose a bite, seated himself with a mess and began his breakfast quite calmly, not saying a word of what had just passed at Agreda. Happily, he was seen by M. Tassin, who, astonished at finding him returned, asked him where he had left the officer whom he had been ordered to escort. '*Ma foi,*' replied the Norman. 'I left him in the big town, his head nearly cut off and fighting with some Spaniards who were hacking at him with their sabres.' At these words Lieutenant Tassin ordered his men to arms and choosing fifteen of the most agile, set off double quick for Agreda. The officer and his little troop had made a league, when hearing shots they concluded that I was still alive, but in sore need of help. Stimulated by the hope of saving me, the brave men redoubled their pace and at last perceived me at the crest of the hill serving as target for the Spaniards' guns.

"M. Tassin and his party were tired out and I could do nothing more, so a halt was made, during which you may be sure that I thanked the Lieutenant and his men most warmly. They seemed as happy as I. We returned to the bivouac where M. Tassin had left most of his command. The vivandiere of the company was there with her mule carrying two panniers of wine, bread and meat. I bought them for the soldiers and we sat down to the breakfast of which I stood in so much need and in which we were joined by the two hussars who had stayed with the post all night. One of them, mounting the peasant's mule, lent me his horse and we set off for Tarazona. I suffered horribly, for the hardened blood had formed a clot over my wound. At Tarazona I found Marshal Lannes' advance guard. The general in command made me dress my wound and then gave me a horse and two hussars to escort me as far as Tudela, where I arrived in the middle of the night.

"The Marshal, although half sick, received me at once and seemed much moved by my misadventure. However, the dispatches must go at once to

the Emperor who was doubtless very impatient for news of the army of the Ebre. I was still more anxious to carry them myself, as the Marshal, his eyes opened by what had just happened in the mountains, consented to the messenger's going by Miranda and Burgos, where the roads were protected by French troops. But I was so full of pain and so utterly worn out, that it was physically impossible for me to go at the necessary speed. So the Marshal gave the commission to Guéhéneuc, his brother-in-law. I gave him the dispatches which were stained with my blood. Colonel Saint-Mars, chief of the bureau, wished to recopy them and change the envelope. 'No, no' said the marshal. 'It is good for the Emperor to see how valiantly Captain Marbot has defended them.' He dispatched the packet just as it was and sent with it a note explaining to his Majesty the cause of the delay, sounding my praises and asking a reward for Lieutenant Tassin and his men who had come to my rescue without calculating the dangers to which they might be exposed if the enemy should be numerous.

"The Emperor soon after bestowed the cross of the Legion of Honor on M. Tassin as well as on his sergeant; and a recompense of 100 francs to each of the carbineers who had accompanied them. As to the Norman soldier, brought before a court-martial for having abandoned his post in presence of the enemy, he was sentenced to drag a cannon-ball at his foot for two years and to serve the rest of his time in a company of pioneers."

LETTERS ON INFANTRY.

BY PRINCE KRAFT ZU HOHENLOHE-INGELFINGEN.

Translated by 1st Lieut. CARL REICHMAN, 9th Infantry.

XV.

THE COMMAND OF THE BRIGADE.

A.—INTERIOR AFFAIRS.

IF I propose to-day to give you some of my ideas on the command of the brigade as they have come to me in the course of my services, I do not mean to give an exhaustive compendium on the subject.

There is no need for it. Von Scherff has treated the theory of the command of troops exhaustively and in detail, as has Brousart in his "Duties of the General Staff." In view of these scientific works and of the new practical drill regulations, all based upon the experiences of the latest wars, there are no new doctrines to develop. I wish to discuss in detail some small, even paltry matters, and on meeting features of frequent occurrence and injurious consequences, explain how I think such consequences may be avoided. You may call me pedantic if you like, for laying stress on such trifles. I am sure that all scientific men will agree with you, especially those who study principally strategy, Clausewitz and the larger operations of war. But small causes, great effects. Hence: *ad rem*.

When a brigade assembles at the rendezvous as part of a greater unit or for the purpose of independent action, you will find in ninety-nine cases out

of one hundred, if you follow the movements of the smallest units of troops, that the company assembles first in its own cantonment. After standing on the company parade for a quarter of an hour, it marches to the rendezvous of the battalion, which perhaps had been distributed over several villages. The rendezvous of the battalion is sometimes made dependent upon the cantonment of the major, and not upon the principle of avoiding circuitous routes, *i. e.*, upon the point where the leading company (according to the direction of march) is quartered. Thus it may happen that a company has to march a quarter of a mile to the rear, only to wait a quarter of an hour at the battalion rendezvous and then to again march through its cantonment en route to the rendezvous of the next higher organization. It may deem itself fortunate, if the regiment has not ordered a separate rendezvous, but has permitted the battalions to march directly to the rendezvous of the brigade. The desire of joining the next higher organization at the head of a complete and formed body of troops, is the natural consequence of a commendable regard for order, which every commander feels himself bound to maintain. But it may be carried too far. It is evident how much useless marching may be caused and how much of the men's strength uselessly expended in this way. If you think that I am exaggerating just go the companies and you will see that such things are happening now as well as formerly, when in the course of a long peace we seemed to have forgotten that in peace we must prepare for war. Or if you say that such pedantries only happen in time of peace and that there are some good points about them tending to the maintenance of good order, but that in war they will cease spontaneously, I must remind you that in the war between the kingdom of A and the empire of B, Colonel G was ordered to start at once in pursuit of the enemy who was reported as having retreated during the night, that he called in his outposts and assembled his regiment on the battalion in the rearmost cantonment, four miles in rear of the outposts, then dressed the regiment on the markers and then broke into marching column. What one has learned and become accustomed to in peace, one will also do in war, in the beginning at least. If you think that such things can no longer happen with us, then go with me to the rendezvous of a brigade but so early that we are there before the first soldier arrives. There you can observe, if we are so fortunate as to witness an extreme case, just such useless expenditure of time and energy, caused by the different rendezvous of the companies, battalions, regiments and brigade; by the uncertainty whether packs may be unslung or arms only stacked or whether to wait for orders with ordered arms. By changes of formation on assembling, by repeated and unnecessary dressing on markers, much time is lost and much of the men's strength absorbed which might be used for exercises useful in war, march and battle. In the most favorable case twenty minutes are lost and under unfavorable circumstances, especially when the first alignment is not good, half an hour or an hour, and a corresponding amount of the strength of the men.

How to remove these evils and losses of time without relinquishing military precision and order, on which all discipline is based, has formed the subject of my studies ever since I commanded infantry. One of my brigade

commanders—I acknowledge it, not wishing to deck myself with the plumage of another—demonstrated it to me, and after that I had it done by the whole division. He directed once for all, that whenever he ordered a rendezvous for the brigade, the battalion, the color company of which was first to arrive, was to be the battalion of direction during the formation at the rendezvous. In order that the brigade might be correctly formed as prescribed, the battalion arriving first was to be held responsible for choosing its place correctly. Every battalion arriving later was to form and dress on the first one. No battalion was to wait at order arms but as soon as formed to stack arms, unsling packs and rest until further orders. Only the colors were to be fixed in the ground vertically, until the other battalions had taken their places.

Let us suppose for instance that the line of front and right flank of the rendezvous have been designated in the brigade order, and that the left battalion of the second line arrives first on the ground. Then the adjutant of this battalion galloping ahead, must step or ride off from the front and right flank, the exact spot on which the colors of the left flank battalion of the second line are to rest. The battalion on arriving has to form and dress at once, stack arms, unsling packs and rest. All other battalions must then form on the colors of the left wing of the second line without disturbing the rest of the first battalion.

When upon the arrival of all troops the brigade commander commands "attention," the brigade must stand as prescribed in the drill regulations if the colors have been posted correctly, for I assume that you know that the regulations prohibit the platoons of the several battalions of the two lines from covering, and only prescribe that each individual battalion be correctly formed.

This arrangement saves the battalion which first arrives from waiting half an hour or more with packs on, and nothing fatigues troops more than that. The soldier would much rather be marching all this time.

Taken together these two measures—avoiding unnecessary rendezvous for each unit, company, battalion, regiment, brigade, and keeping the men in ranks waiting with packs on at the place of brigade rendezvous sometimes saves an amount of energy equal to the march of four miles. Troops thus spared can be marched four miles farther on that day. Under certain circumstances this may decide a battle. Do you still think me a pedant? Small causes produce great effects.

You will blame me, perhaps, for speaking against forming line before marching, thinking it necessary, in the interest of order, that every soldier should be inspected every morning by his superior. I also believe this inspection to be absolutely necessary. Once a day, however, is sufficient. If done at the place of assembly in the cantonment, be it by company, battalion, $1\frac{1}{2}$ battalions, etc., and upon falling in before marching, it will be quite enough. To assemble each organization for this purpose daily in a separate rendezvous is bad. In time of war even the daily inspection by the corporal will have to be omitted on many days for lack of time.

To make sure that the brigades practised economy of the men's strength in this way, I used to so arrange my brigade inspections, that I was at the

place of rendezvous before the arrival of the first soldier and personally superintended the formation of the assembling masses.

Let us now follow the movements of a brigade when it starts from the place of rendezvous. Not infrequently the brigade commander has the whole brigade sling packs and take arms at once. When an infantry battalion breaks into column of sections, it has (on a war footing) a depth of about (not quite) five minutes' march. If the brigade consists of six battalions, the last battalion has to wait twenty-four minutes with packs on before starting, again a wholly unnecessary exertion. It is so simple and plain that the troops are spared if each battalion slings packs when the preceding battalion is about to start. And yet this simple measure is often omitted simply from a desire, commendable in itself, of preserving good order in everything at all times. This desire cannot be carried too far in smaller organizations (companies) but should not, however, be pushed to an extreme in large masses at the expense of the strength of the men. If you think that such unpractical things do not happen, I will quote an example. Once I had assembled the division at the rendezvous to make a field march of four miles following it up with manœuvres in attack against a marked enemy. After giving out the dispositions I ordered the advance guard to start and the exercises to begin. The day was hot. When the regiment marching at the rear of the column and acting as reserve, was to deliver the decisive blow, it was so exhausted by heat and fatigue that it had to be given a rest before the final act of the manœuvre could take place. Surprised that a march of only four miles should exhaust a regiment to such an extent, I looked for the cause and found that the regimental commander had the men put on the packs and take arms when the advanced guard started, although the order of march placed his regiment at the rear of the column. Of course the regiment had thus to stand uselessly at an order for over an hour in the broiling sun instead of utilizing this time for procuring drinking water from the village near by. Do not tell me that such folly is rare. When the consequences have been once seen, it is easy to talk wise afterward. This very regimental commander was one of the most intelligent officers in the army. But he was new in his position, young, ambitious and anxious to have his troops present an orderly and smart appearance at all times.

On that day I had assembled the division in one rendezvous and did so every day on which the division manœuvred under my command in order to see and greet the troops if for no other reason. In war I would not do so even if the whole division were bivouacking in one spot and had only to move out of its bivouac, for in that case the troops marching last would have to be disturbed one hour earlier than necessary. I should prefer to issue the marching orders and (if the troops were dispersed in cantonments) to designate the points where the brigades, etc., are to join the column. An infantry brigade however, which is to march closed up, (for instance the brigade forming the main body of a division) cannot well allow its individual battalions to join the column from their cantonments at several points, because mistakes might easily happen which spreading and increasing might bring confusion into the whole operation. Such a brigade should therefore have a separate rendezvous.

If we accompany the troops on the march, we shall first notice the importance of the distances which the companies and battalions have to preserve from those in their front. I have stated above, that the battalion has a depth of five minutes' march. This may surprise you, since the battalion of 1000 men in line* has a front of 300 paces and should when wheeling into column or marching by the flank, have a depth of 300 paces only. But in war it marches in battle formation and therefore in two ranks, hence the depth of the marching column in sections becomes 450 paces. It is of the greatest importance in war-time marches to leave distances not only between battalions, but between companies also, in order that small checks may not spread to the troops in rear and that the air may circulate freely between these dense masses of men. Any one who has made such a march—that is to say every private of infantry, several millions of men in Germany—knows how disagreeable, annoying, fatiguing these checks are on the march, when at every few minutes, enveloped in dense clouds of dust, he runs his nose against the pack of the man in front of him. He has perpetually to halt, not knowing whether it is worth while to order arms, even though the command—"order arms!" be given, for at the command "shoulder arms!"—he must take up his rifle and start again.

It is a well-known rule that troops occupy one side of the road only, leaving the other side free for mounted men, staff officers, adjutants, and those coming in the opposite direction. This keeping to one side of the road is often very trying to the troops, especially infantry, who cannot on this account always select the best part of the road to march on, especially when as on a paved road this is in the middle, or on a wet one, runs now on one side, now on the other. For this reason no regulation is more frequently disregarded than this one, and it requires earnest endeavors on the part of the higher officers to have it enforced. To relieve the much suffering infantry and derive some benefit for the men from this regulation of marching on one side of the road, the II Army during the War of 1866 directed that the infantry should habitually march on the windside, and that staffs, adjutants and all mounted men in general should pass on the dustside, in order that the dust thrown up by the horsemen might not molest the soldiers. This arrangement proved successful, but only when the direction of the wind was at a decided angle to that of the march. When the wind came obliquely so that at the turns of the road the dust was blown over it now from the right, now from the left, this order could not be adhered to, because troops must not cross to the other side of the road, for at the point of crossing communication is shut off. I once witnessed a terrible confusion caused by changing to the other side of the road.

Rests during the march are of still greater importance. We are right in strictly enforcing the rule that infantry shall not stack arms on the road, because it would entirely prevent communication along it. Whoever has once ridden past infantry thus halting, as I did frequently, can appreciate it. Commanders, therefore, who obey this regulation and otherwise lay stress on good order, form their troops in the rendezvous formation before stopping for rest and stacking arms. Much time is thus lost and much energy use-

*Three deep. Translator.

lessly expended. For short rests it is sufficient if the troops in marching columns, leaving the road by the right or left flank, stack arms along the roadside; for longer stops each battalion might form line if necessary. If cooking is to be done during the halt, it is advisable, on account of the common mess, for whole regiments to form up, cook and rest.

Among the measures for economizing the strength of the infantry, those are most noteworthy which tend to prevent sunstroke. Nothing is more terrible, nothing makes its appearance so by surprise and with such frightful power as the sudden sunstroke. It spreads with overpowering rapidity. Perhaps you notice that the men's faces are unusually red and ask them if they feel tired, or heated and need rest. That is the most inappropriate thing you can do, for you are sure to get an incorrect answer. The more the brain is heated by the temperature the more is the men's ambition roused. With nervous courage one of them says: "Oh, we are still getting along," and all join in with him, for no one wishes to appear weak. A few minutes afterwards a man drops and instinctively sticks his head into a bush by the roadside seeking protection against the scorching rays of the sun. Two of his neighbors are told to care for him, but they too drop. The other men notice it and suddenly the previous valor changes into the opposite. A sudden panic takes hold of the men and terror seizes them, for nothing is more formidable than an unseen foe. Suddenly ten, fifteen or even twenty men drop at once, some from terror, others from dizziness, others from exhaustion increased by terror. For it is always a certain locality that gives the final blow, be it a ravine when there is no breeze, or a turn of the road when the sun is unusually severe. Every one who arrives there, is seized by exhaustion as by a demon.

Things must not be allowed to come to that.

The surgeons recommend many expedients against sunstroke. Not all are practicable. It is recommended, for instance, to march during the cool hours of morning and evening, and to rest during the hot hours in the middle of the day. But when large masses march on the same road, individual organizations cannot choose their hours for marching; for the road is covered day and night and every organization must march at the appointed hour. Nor is it known on the day preceding the march when the instructions are given, how the weather will be. I remember a case when on the day preceding the exercise when the orders were issued, it was so cold that cloth trousers were ordered to be worn. Next day it became suddenly hot and damp. The best thing recommended by the doctors is to let the men drink as often as water can be obtained. They also direct that on such dangerous days the collars and upper-coat buttons should be unfastened and more frequent halts made than the state of fatigue of the men may call for. It is also important to march with ample distances between the companies and to watch the appearance of the men carefully. Men, when heated, become red in the face and perspire, as every one knows. But that does not imply a sunstroke yet. When, however, the red color in many men's faces assumes a darker bluish shade, then it is high time to march the column by the flank off the road, stack arms and rest and look around for drinking water, for the dark bluish color with perspiration is followed

by a sudden suppression of the latter with absolute dryness of the skin and pallor. When these forerunners of sunstroke once show themselves on a few men, it is usually too late to make arrangements which require some time for execution. I can only repeat: the only remedy is to rest frequently and drink water when the temperature renders sunstroke probable.

But I have entertained you long enough with elementary details, which may not be to the taste of highly gifted tacticians and strategists. But what are the most scientific dispositions good for if the troops do not reach the enemy at all or with only half their numbers or in a condition unfit for battle? We defeat the enemy as much by the legs of our infantry as by their rifles. How will it be if we consume the best part of the strength of these legs by faulty arrangements for the march?

I could name you a colonel of infantry—I will not give his name for on that same day he died a hero's death—who in order to bring timely aid to the troops on the battle-field of Vionville, marched his regiment closed up, constantly saying: "Forward! Forward! come what may! never mind," and left great numbers of exhausted men lying by the roadside. The assistance he brought, would have been far more effective had he arrived a half an hour later with twice the number of rifles. He neither stopped nor gave the men time to drink water. Compare this with the march of the Guard corps on the following day; it started northward from the road Dieulouard-Bernécourt-St. Michiel early on the morning of a burning hot day; but allowed itself time to unsling packs, marched on five parallel roads, kept large distances and rested frequently. Yet it reached Hagéville as early as 10 A. M. without casualties, and was then ready to assist the army corps which had fought the day before, if Bazaine had on the 17th launched his intact reserves to the attack.

Perhaps you will ask me why I do not hold forth with the same zeal concerning the infantry boot, and you are right in asking the question. I am sure I would discuss it fully, if this most important question had not been recently so thoroughly discussed from many points of view that there is no more to be said about it, and if I did not think our infantry boot a very good one. In one respect only I would like to invite your attention to the question of footgear. At the beginning of a great war troops at first are transported by rail for days. During this time the feet swell. The reserves called in all receive new boots which have been kept on hand, and have become hard. After detraining, long marches are usually required of troops and many men become footsore and exhausted unless frequent short halts are made and the footgear is looked after.

To recompense you for these seemingly tedious matters, I will entertain you in my next letter with applied infantry tactics.

RUSSIAN EXPERIMENTS WITH FIELD MORTARS
AGAINST FIELD FORTIFICATIONS.Translated from the *Revista di Artiglieria e Genio*.

By Captain THOMAS M. WOODRUFF, 5th U. S. Infantry.

GOLD MEDALIST.

I N the year 1890 some experiments in firing with the 6-inch (15.2 cm.) field mortar against field works were carried out at the artillery polygon of Kiev, Russia. These experiments are of such special importance, that a summary of them taken from the Russian military journal, *Vojenni Sbornik*, No. 6, 1891, is here given.

I.

Firing against trenches occupied by a skirmish line and its supports.

The scope of the experiment was to test the comparative efficacy of the fire of heavy field guns 4.2-inch (10.67 cm.) and of 6-inch (15.2 cm.) field mortars against hasty entrenchments. A number of shots equivalent in quantity of bullets and fragments were fired from the two guns, under identical conditions as to height of target and distance. To this end two groups of trenches were constructed, each one having a capacity of two platoons (8 squares) on a war footing; that is, there were eight trenches, six of which were on the line of skirmishers (occupied by the six squares), and two at about 100 paces in rear for the supports (2 squares).

The men in the trenches were represented by counterpoised targets of different shapes and sizes, according as men would stand, kneel or sit. As many heavy guns as mortars were fired from the same distance—1900 to 1950 metres; from the guns 24 shell and 100 shrapnel were fired; and from the field mortars 12 percussion shrapnel and 50 shrapnel with time fuses. One hundred shrapnel from the field guns, and fifty from the field mortars give about the same number of bullets and fragments, about 35,000.

Results.

1. Firing with heavy field guns.

(a) Against the right trench (profile target riflemen standing). Of the 24 targets (full figure) placed therein, 19, or 80%, were hit; the number of bullets and fragments which struck was 115, of which 48, or 41%, were at the height of the head, and the remainder below that point. The shell demolished the parapet at the right end of the trench to the extent of 4 paces, and made a crater 1.20 metres in depth.

(b) Against the middle trench (profile target riflemen kneeling). Of 24 targets (half figure) that were in the trench, 11, or 46%, were hit by 42 bullets and fragments, of which 39, or 93%, were at the height of the head.

(c) Against the left trench (profile target riflemen standing). Of 24 targets (half figure) 7, or 29%, were hit by 19 bullets and fragments, of which 3, or 16%, were at the height of the head.

(d) Against the trench for the supports (profile riflemen kneeling). Of 24 targets (half figure), placed therein, not one was hit.

2. Firing with the field mortar.

(a) Against the right trench (profile target riflemen standing). Of 24 targets (full figure) 12, or 50%, were hit by 15 bullets and fragments of which 6, or 40%, were at the height of the head.

(b) Against the middle trench (profile target riflemen kneeling). Of 20 targets 15, or 75%, were hit by 52 bullets and fragments of which 26, or 50%, were at the height of the head.

(c) Against the left trench (profile target riflemen standing). Of 20 targets (half figure), placed therein, 19, or 95%, were hit by 132 bullets and fragments of which 42, or 33%, were at the height of the head.

(d) Against the trench of the supports (profile of riflemen kneeling). Of 24 targets (half figure) not one was hit.

The following table gives the results of the firing against the two groups of trenches.

Name of Group.	Distance (Metres.)	Total number of Targets.	Dimensions of Objects.		Targets struck.	Bullets and Fragments, which struck.	Fragments that hit not below the height of the head.	Remarks.
			Front Metres.	Depth Metres.				
Group A Firing with heavy guns.	1950	96	140	70	37 (39%)	176	90 (51%)	{ One hour and fifteen minutes were occupied in firing.
Group B. Firing with field mortars.	1950	88	105	90	46 (52%)	199	74 (37%)	

The commission entrusted with the experiments expressed the following opinions:

1. One hundred shrapnel from the heavy field guns placed four-tenths ($\frac{4}{5}$) of the defenders of the trenches *hors de combat*; while fifty shrapnel from the field mortars placed over half of them *hors de combat*. As was expected, the mortars proved of greater effect than the guns, although not to the degree supposed; the superiority resulted in a total of 13%.

2. With respect to the mortars still another property should be noticed; it is, that of the bullets and fragments of the successful hits about $\frac{1}{3}$ struck at the height of the head, from the neck upward, and $\frac{2}{3}$ below; whilst of the successful hits from the heavy field guns more than half produced no effect below the neck. In other words, the degree of protection offered by trenches to their own defenders is less when exposed to the fire of the field mortars, and greater as regards that of other field guns.

3. The time necessary to produce the above results with both kinds of guns was almost the same.

4. It could be said that the difference in effect, not very important, from the shrapnel of the field mortars, and those of the heavy field guns, arises

from the slight knowledge of the former, only recently adopted, and the perfect knowledge of the latter, which have been much longer in service; therefore a more noticeable difference in future experiments may be expected.

II.

Firing with the 6-inch field mortars against field works and wire network pertaining thereto.

These experiments consisted in shrapnel and percussion shell fire with the field mortar against field works at a distance of 1600 to 2100 metres.

The scope of the experiments was:

(a) To determine the relative security of the garrison of a field work, stationed in the trench of the parapet, and inside, in the ditches of the lateral traverses, and in the trench behind the gorge of the work.

(b) To show the effect of the bullets and fragments upon the shelters.

(c) To determine the action of the projectiles against shelters covered with earth.

(d) To verify the action of projectiles against a simple wire network.

To decide these questions a company on war footing constructed a work on a sandy height, formed like a bow; the general shape of this height determined the kind of work to be constructed—a very flat lunette of 105 metres development across the line of fire and only 25 metres in depth. The profile was that fixed by the rule for the labor of sappers, that is with a height of 1.40 metres, and a thickness of four (4) metres.

In the interior of the work a trench was constructed, having depth of 2.60 metres behind the line of fire and 2.75 below the same. Outside of the work a ditch was made 2.75 metres deep, and 4.25 metres across the top. The profile of the work at the gorge was very contracted, being as stated above, only 25 metres in depth. In the interior, in the traverses and at the gorge, there were shelters of various kinds; and adjacent to the left flank and in a direction perpendicular thereto, a defense trench.

In the interior of the work were placed the following counterpoised targets, representing men seated:

108 in the trench of the faces.

30 in the trench of the left flank,

26 in the trench of the right flank.

48 in the trench of the right defense of the gorge.

48 in the trench of the defense inside the work.

33 in the right part of the communicating ditch, which from the last ditch leads into the parapet.

12 in each of the little ditch defenses against shrapnel.*

25 in the ditch at the extremity of the left flank.

A.

Shrapnel fire with the field mortar.

(a) From the distance of 2150 metres, firing in a direction perpendicular to the left face there were fired with the mortar 12 percussion shrapnel, and

* These are little ditches that pass in front and in rear of the traverses; there may be four, one in front and in rear of each of the flanks.

30 time-fuse shrapnel, with an elevation of 94 to 97 lines (23.8 to 24.6 cm.) corresponding to the distance of 2120 metres. The firing occupied about an hour.

Results:

1st. Of the 108 targets placed in the face 59, or 54.60%, were hit by 162 bullets and 10 fragments.

2d. In the left flank, 20 targets (66%) were hit by 31 bullets; and in the right flank one target (4%) was hit by two bullets and one fragment.

3d. In the right communicating ditch and in the trench within the work, of 81 targets, 22, or 27%, were hit by 122 bullets and fragments.

4th. In the defense trench behind the gorge of 48 targets 5, or 10%, were struck by 5 bullets.

5th. In the little trenches on the right defended against shrapnel, not a target was hit, whilst out of 12 on the left 6, or 50%, were hit, all of them in the anterior ditch.

6th. In the ditch adjacent and contiguous to the left flank, of 25 targets, one, or 4%, was hit by two bullets.

Out of a total of 366 targets, 98, or 27%, were hit by 322 bullets and 14 fragments.

The greatest injury was done to the targets in the face of the work and in the left flank (66%); the least injury (4%) was to those in the right flank, and in the ditch contiguous to the end of the left flank; in fact, those targets in the little defensive trenches on the right were not hit at all. Moreover, the fragments that struck splinter proofs on the ground, and the blinds of the shelters produced no damage.

(b) Afterward from the same guns with an elevation of 104 lines (26 cm.), corresponding to the distance of 1500 metres, 50 time-fuse shrapnel were fired still in the direction of the capital, for the purpose of determining the effect of shrapnel from mortars under the most unfavorable conditions relative to the depth of the target.

Results:

1st. Of 108 targets placed in the trenches of the faces, 75, or 69%, were hit by 119 bullets and fragments.

2d. Of 22 targets, in the trench inside the work, and placed outside of the shelters, 2 were hit and totally destroyed, and 7 were pierced by 57 bullets—a total of 41%; besides, in the parapet two craters were found, one of which was 91.4 cm. across.

3d. In the communicating ditch on the right, of 34 targets, 9, or 26%, were hit by 17 bullets and fragments.

4th. In the little defense trenches against shrapnel, no targets were struck.

5th. In the trench of the shelter within the gorge, of 48 targets, 3, or 6%, were hit by 3 bullets.

6th. In the ditch at the extremity of the left flank, of 25 targets, 4, or 16%, were struck.

The commission expressed the following opinions:

1st. Evidently the firing done absolutely enhances the power derived from the field mortars as compared with shrapnel from heavy field guns.

In fact about two thirds of the defenders of the faces, who were seated in the ditch within the parapet, were placed *hors de combat*; so that certainly all confidence as to the defensive value of the work occupied would have been lost to any men destined to defend it.

In order then to contrast the effect of shrapnel from the heavy field guns and from the field mortars, the following table of results of firing with both in 1889 against the same earth-works are of great value.

I. FIRE IN A DIRECTION PERPENDICULAR TO THE LEFT FACE OF THE WORK.

Name of the part of the work.	Heavy Field Guns.			Field Mortars.		
	Distance. Metres.	Number of Projectiles.	Per cent. Hit.	Distance. Metres.	Number of Projectiles.	Per cent. Hit.
1. Trench of the parapet of the face.	2300	80 shells and 40 shrapnel. (About 300,000 fragments and bullets)	0	2120	62 shrapnel (About 42,000 fragments and bullets)	54
2. " " parapet flank.			0			66
3. " within the work.			2			27
4. Little defense ditch.			40-20			25
5. Trench of the shelter within the gorge.			56			10
6. Ditch at end of left flank.			0			4

II. FIRE IN DIRECTION OF THE CAPITAL OF THE WORK.

1. }	1800	153 Shrapnel. (About 46,000 fragments and bullets)	0	1500	50 Shrapnel. (About 35,000 fragments and bullets)	69
2. }			0			0
3. }			0			41
4. }			0			0
5. }			10			6
6. }			0			16

It follows that during the firing of the field mortars the most dangerous post for the garrison of the work is in the trench of the shelter within the gorge of the work; then in order increasing in danger came the following: the ditch at extremity of the flank, the shelter trench against shrapnel, the trench in the interior, the trenches of the flanks, and lastly those of the faces.

3d. In the fire at the average distance, with heavy guns, and when fire is in direction of the capital of the work, its defenders, who have not shown themselves by firing, and who are in the interior ditches of the faces, can consider themselves out of danger, except in the case of fire with field mortars; other conditions remaining the same, the defenders can be considered safe only under shelters (shelter palisades) under the parapet of the faces. But the construction of such shelters will not always be possible, considering the work on field entrenchments which must ordinarily be done in from six to twelve hours.

4th. In the present case, with the purpose of obtaining a great number of effective hits, the work is left entirely unprotected. But in actual service it will be sought to mask similar field works by every possible means, that is by working so that this small plot of surrounding ground may be confounded in color with the works, or by diminishing the relief of the profile, and the dimensions of the interior ditch, or in fine by constructing additional works within the military brow of the height, at a distance from this equal to the effective range of small-arms' fire (*i. e.*, from 350 to 636 metres), and occupying this same military brow with rifle pits.

B.

Fire against the work with torpedo shells* from the 6-inch field mortar.

The firing was made in a direction normal to the left face, from a distance of 1800 metres, with a charge equal to half of the service charge. One hundred torpedo shells were fired, taking an hour and a half.

Results:

1st. Anterior to the glacis, and as far as 30 metres in front of the same, 14 craters were made of a diameter of 1.85 to 2.15 metres, and a depth of 0.90 of a metre; these were found principally in the left face between the angle of the left shoulder and the middle of the same face.

2d. Upon the glacis, moreover, four craters were found of a diameter of 1.85 to 2.85 metres, and of a depth of 0.60 to 1.00 metre.

3d. The exterior ditch of the left face was found in great part filled up; instead of the original depth of 2.84 metres, it was scarcely 1.70 to 1.83 metres in depth.

4th. In the parapet 10 craters were made of the following dimensions:

	Diameter. (metres.)	Depth. (metres.)
1. In the right face,	1.83	0.60
2. " " " "	1.83	0.75
3. " " " "	1.83	0.60
4. " " " "	1.68	0.60
5. " " " " near the salient.	2.90	1.06
(2) 6. In the left face,	(1) 2.44	(1) 1.22
(2) 7. " " " "	2.90	0.90
8. " " " "	2.90	1.06
9. " " " "	2.75	0.90
(2) 10. " " " " near the angle of the shoulder,	1.40	0.75

NOTE 1.—Near the location of this crater the scarp of the parapet crumbled completely; making a breach that would have permitted the attacking force to penetrate to the terre-plein.

NOTE 2.—The projectiles at these points penetrated the parapet from front to rear.

5th. In the parapet corresponding to the interior trench, and in that corresponding to the ditch of communication, four openings were found, three of which went from side to side of the parapet.

6th. In the shelter trench against shrapnel outside and in rear of each traverse of the flanks, only the anterior of the occupied traverse on the left

* Concerning the action of the torpedo shell it must be noted that in bursting it makes a great number of small fragments, which are thrown as far as 650 metres, only a part of them remain in the crater, which takes a very irregular form. It is noted, too, that the soil was sandy.

flank was hit by a single torpedo-shell, which demolished the parapet without endangering the shelter.

7th. In the parapet of the trench within the gorge, symmetrically coupled at the right and left of the shelter, 4 craters were found of a diameter from 1.83 to 2.60 metres, and of a depth of 0.75 to 0.90 metres.

8th. On the slope and at the summit of the hill standing back of the trench of the gorge, as far as a distance of 20 metres from the latter, 10 craters were found of a diameter from 1.83 to 2.20 metres. Inside the space included within 30 metres in front of the glacis and 20 metres behind the trench of the gorge a total of 56 craters were made.

9th. Of four shelters constructed in the work, by chance not one was struck; moreover not a torpedo-shell fell in the ditch adjacent and perpendicular to the left flank, and as far as 15 metres from the same.

Taking all this into consideration, the commission concluded that the fire with torpedo-shells had made the left face sufficiently easy to mount, but nevertheless the sight of that fearful destruction would have produced such dismay on the garrison, that it probably would have abandoned the work without waiting for it to be taken by assault.

Whilst in this trial not a shot had fallen upon the shelters, yet in other experiments made during the course of firing, it is shown that no existing type of such field shelters is in condition to resist, not only the action of torpedo-shell, but also that of percussion shrapnel; whence if it is desired to construct shelters in a work, they should be made only under their own particular parapet, and masked with a revetment at least 1.50 metres in thickness.

It is also proved with respect to sandy soil, that the regular profile, after being struck by several torpedo-shell, presents no obstacle to any assault.

In fact the employment of field mortars in combat demands that field works be devoted to their use, masking them carefully by every possible means in each particular case.

C.

Fire against wire network with 6-inch field mortars, using torpedo-shell.

The tract of land covered with the network against which the firing was done, was 18 metres long by 8 metres wide, and was masked by a glacis of 1.50 metres.

Against such accessory defense from the distance of 1050 metres, 50 torpedo-shells were fired, with service charges, the firing lasting 45 minutes.

After the firing 9 craters were found in the glacis that masked pickets, and 13 craters, in the glacis of the network; in the centre of this same network 3 craters and 8 stakes torn away from the soil were found; nevertheless in this defensive work no proper passage for an easy crossing resulted; so that this in the assault of the work would have presented the same obstacle as it did before the firing.

From these experiments the results were:

1st. That, even firing with torpedo-shells it is not possible to destroy a network of wire and stakes, otherwise than by enfilading it, or striking it obliquely.

2d. That the existence of a glacis, which masks such an accessory defense is of great value.

Military Notes.

PHOTOGRAPHY AND RECONNAISSANCE.

AT the Royal United Service Institution an instructive lecture on "The Employment of Photography in Reconnaissance" was delivered by Lieut. F. J. Davies, *p. s. c.*, Grenadier Guards.

After describing briefly the various operations requisite to produce a photograph, the lecturer pointed out some of the advantages that would accrue if photography were used for illustrating sketches and reports. First of all, a very great number can never learn to draw, while all can learn to photograph sufficiently well for the purpose in question. Again, the accuracy of a photograph is very much more certain than the accuracy of a drawing, and the time occupied in the field in taking a photograph can usually be measured by seconds, whereas to sketch a landscape entails a halt of some minutes. The plate too can be exposed by one man, and developed and printed from by another, and, when once a photograph has been taken we have the power of reproducing it to any extent.

Every great Power has established in some form or other an organization analogous to our Intelligence Department for the purpose of collecting and compiling information concerning foreign countries, and which is therefore in constant receipt of reports from agents abroad. These reports are the result of reconnaissances executed in time of peace, and in such, great use can be made of photography. Opportunities will often occur for using larger cameras than can be used when weights have to be kept down, or if only a small camera is used. By means of photography it will often be possible to give a far better idea of the nature and appearance of a country than a written report can possibly give. Photographs could be taken of important road junctions, easily recognizable points along a route, such as peculiar rocks, trees, etc., entrances to mountain passes, difficult places, also points where rivers are fordable; a dotted line on the print would show the position of the ford, and the route to be followed in crossing the river. The negatives could be stored, and, in the event of operations taking place in the country, copies could very quickly be printed for distribution. Enlargements could be made when advisable.

The position and appearance of forts can often be admirably shown by means of photographs; enlargements will often bring out a surprising amount of detail. The lecturer, however, did not recommend photographing forts abroad as a pastime, as it is a practice to which the police abroad have a most rooted objection.

For rapid work, where the plates would be developed, and prints taken

as quickly as possible, and handed in with the report or sketch the same day, portability and simplicity of apparatus are the first desiderata. It is not required to produce pretty pictures, but merely to record the appearance of an object so that it shall be easily recognizable from the photograph. Such things as yellow stains, hardness, and other troubles so familiar to photographers may be utterly disregarded.

An exposure can often be made without dismounting, but this requires care, as sometimes the result is a view of the horse's ears. With fast plates the light will not often necessitate a time exposure; even in winter what is commonly called a snap shot is sufficient.

The "outfit" for rapid work must be extremely simple and portable. The camera should be of such a size as to be easily carried in the pocket or attached to the saddle; it should be light, and should be strong enough to stand the rough usage of a campaign. The shutter should be inseparably attached to the camera; a "view-finder" is indispensable, and it should also be part and parcel of the camera. It should also be possible to give time as well as instantaneous exposures, and for this purpose the camera should be capable of being placed on legs. The stops should be rotatory, or an "Iris" diaphragm should be used. As regards plates and films, it is of the greatest importance that these should be specially manufactured to stand extremes of heat and cold. Films have a very great advantage over plates, on account of their extreme lightness and portability.

For development it is necessary to have a concentrated developer, one that can be used several times over, and one that will develop prints. Very few dishes must be taken; two would be sufficient, one for developing and one for fixing. As regards paper, for rapid work bromide paper has two great advantages: it can be used while the negative is still wet, when thus used requiring no printing frame; and the light used is artificial, enabling printing to be carried on at night. The prints would be developed and fixed with the same chemicals that are used for the negatives, the only extra chemical required being the acetic acid for clearing; glacial acetic acid should be carried, as this is very concentrated. Bromide paper requires no toning.

In Europe the reconnoitring officer could always depend on finding a house with a cellar, and would find a proper dark room in every town; in uncivilized countries, however, this could not be done, and the question of development and printing is one of considerable difficulty. The last piece of apparatus is a bucket full of water. Where rapidity is essential, negatives can be developed and prints taken off in a very short time.

It has been proposed that balloon photography should be used in sieges by the besiegers. One plan is to start a small balloon, loaded with a camera, but without an aeronaut, to windward of the fortress, the plates being exposed by means of a clockwork arrangement, or a slow match, the time which would elapse before the balloon will reach the point or points where the exposures are to be made being estimated beforehand. As the gas gradually escapes, the balloon descends on the further side of the fortress within the besiegers' line. While besieging Richmond the Federals employed a balloon to photograph on a single plate all the country between

Richmond and Manchester on the west and the Chickahominy on the east. Rectangles were ruled on the prints, and since in subsequent events telegraphic communication was established between the balloon and headquarters, the aeronaut was able to give information of any important events that occurred in any rectangle, which information in several instances proved of great value.

The lecturer then described how photography has been used as a means for obtaining the data for the execution of an accurate survey, acknowledging his indebtedness to Lieut. Henry A. Reed, United States Army, and his work called "Photography Applied to Surveying." As much as thirty years ago, Colonel Laussedat and Captain Javary, of the French army, made surveys near Paris and Grenoble on this principle. One of these agreed exactly with the Government survey, while in the other the differences of level as compared with the regular survey nowhere exceeded nineteen inches. The method relies upon the application of the principles of plane perspective. If we wish to obtain the view of an object in perspective, we start from two projections as data—viz., the vertical projection and the horizontal projection. In applying the method about to be described we work back from the perspective view, *i. e.*, the photograph, to the two above-mentioned projections.

A base is chosen, measured, and its magnetic bearing observed, as in ordinary surveying; from each end of the base a series of photographs of the ground to be surveyed are taken; for each exposure the camera must be carefully levelled, and the magnetic bearing of the axis of the lens observed and recorded. By a mechanical arrangement in the camera the horizon line, and a vertical line representing the vertical plane containing the axis of the lens are marked on the negative, and consequently appear on the print; the point where these two lines cross is what is called in perspective the "principal point."

The "focal length" of a lens can always be ascertained; this is the equivalent of what in perspective would be described as the distance between the "point of sight" and the "principal point." Let us take a simple case as an example: suppose that we have taken one photograph from each end of the base, and that on each there is a representation of two hill tops, the position of which we wish to fix in plan. As we know the length and bearing of the base, it is clear that to fix these points we have only to ascertain their bearing from each end of the base.

We now proceed as follows: on each photograph we draw perpendiculars from the representations of the two hill tops to the horizon line. We then plot the base on the paper in the usual manner, and from each end of the base we draw a line, having the bearing recorded in each instance as the bearing of the axis of the lens, making each of these lines equal in length to the "focal length" of the lens; at the ends of these lines furthest from the base, draw lines at right angles, to represent the horizon lines; the ends of the base will be the "points of sight," and the points where the lines from the end of the base meet the horizon lines will be the "principal points."

We now measure on the photograph the distance from the "principal

point" to the points where the several perpendiculars from the objects fall on the horizon line, and mark off similar distances from the "principal point" on the horizon line on the paper; if we join the end of the base with the points so marked on the horizon lines, we shall be drawing the bearing of the objects from each end of the base, and shall thus be able to fix their relative positions by intersection. In similar manner we can, by the application of this method, ascertain the relative height of objects represented on the photograph. The above description is merely an outline of the way in which the triangulation is carried out. It is said that surveys can be executed by this method with great rapidity.

The lecturer understood that wherever this system had been tried in England it had proved a failure; still it might be of use in open countries, particularly in siege warfare. It would also seem that photographs would be valuable additions to the range tables, as facilitating the identification of points named in the tables.

Photography, too, is of use in reproducing maps and sketches, and in the reduction of dispatches for transmission by pigeons.

SUGGESTIONS FOR IMPROVEMENT OF SCOTT'S TELESCOPIC SIGHT. BY CAPTAIN H. A. BETHELL, R. A.

The recent development of scientific shooting has emphasized the necessity for extreme accuracy in laying our modern field guns. Most officers who have to work with the 12-pounder have now realized that the tangent scale and foresight do not fulfil the required conditions of accuracy. Practice and the instruction target show that the personal error even of good layers is often sufficient to ruin a promising "short bracket," and when the laying is hurried, the short radius of the 12-pounder increases the liability to error. Accordingly we read in a recent number of the "Proceedings" that at the last Okehampton practice Scott's sights were used almost to the exclusion of the tangent scale. These sights were at first looked upon as complicated pieces of mechanism, intended only for deliberate use at extreme ranges. Now we recognise that down to the shortest shrapnel range they are quicker to lay with than the open sights, and far superior to them in accuracy and freedom from error in laying. By this I mean that there is no "there or thereabouts" laying with the Scott's sight. The pointer is either on the object or very plainly off it.

In short I think I may say that most gunners are now convinced that Scott's sight is not an auxiliary to the tangent scale, but is *par excellence* the 12-pounder sight.

This being so it is desirable to make it as nearly perfect as possible. There are three principal objections to the present pattern:

I. The inverting telescope.

II. The vernier.

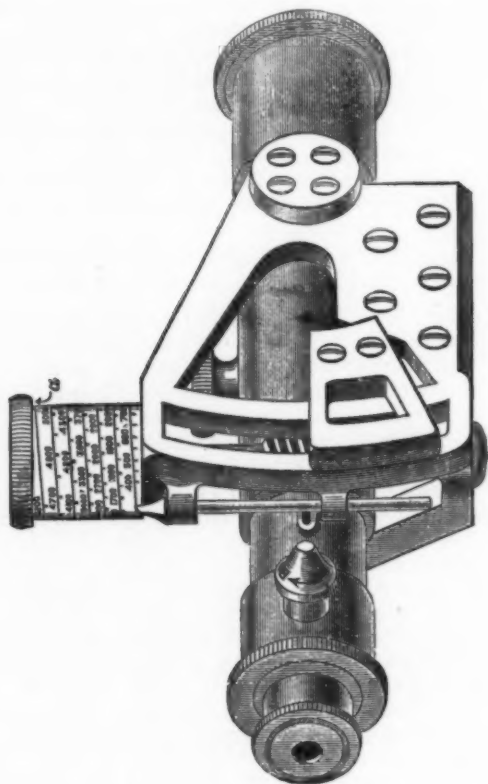
III. The degree scale.

I. The objections to the erecting telescope, as set forth in the handbook, are no doubt serious. But since its introduction the telescopic sight has so much increased in importance, that it would now appear worth while to in-

crease the diameter (and consequent expense) of the telescope in order to overcome them.

II. The vernier is a survival from the days when Scott's sight was looked upon as useful only for deliberate long range firing and not intended for use in the smoke and hurry of the artillery duel. The objections to the vernier are so obvious that it is hardly necessary to insist upon them. To set the

FIG. 1.



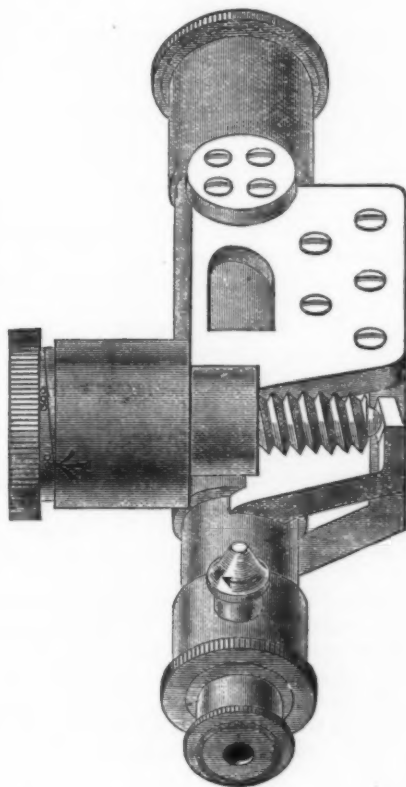
vernier two lines have to be brought into exact coincidence. In the present pattern of sight this has to be done within $\frac{1}{80}$ of an inch which represents one minute of elevation. This amount of accuracy is rather too much to expect from the shaky hand of an excited No. 1.

Another source of error is the division of the scale into half degrees, which entails an addition sum for any number of minutes over 30. Theorists may suppose that it is easy enough to tell that 48 minutes = 30 + 18, but in

this case theory is not borne out by practice. We may say, then, that the vernier is open to four sources of error :

- I. Errors in counting the degree scale and half degree scale.
- II. Errors in counting the vernier scale.
- III. Errors in arithmetic due to the half degree unit.
- IV. Errors in setting due to unsteadiness of hand and eye.

FIG. 2.



The worst of these errors is that the small scale of the instrument renders them difficult to detect except by close inspection. Section commanders well know that (I.) the easiest to detect, is of frequent occurrence; how often may we suppose that the other less obvious errors escape observation?

III. The degree scale. This is another result of the way in which Scott's sight was at first looked upon as a cross between a mathematical instrument and an artillery store. One curious result of the recent development

of artillery as a science has been a tendency to ornament the drill-book with mathematical terms without mercy on the men who have to use them. Continental nations who, unlike ourselves, have had some recent experience in war, have realized that planes and projections, degrees and minutes, and other mathematical technicalities are out of place when the battery is in action. Consequently, a French or German gunner is allowed to lay his gun either by metre scale or by a convenient decimal scale of millimetres.

The system of measuring an angle in term of 90 and 60, useful as it may be in mathematics, was never intended for rapid mental computation. For work in the field it should be replaced by a simple decimal scale, say of inches and tenths.

It is to be regretted that the cross level of the sight is not set at the mean angle for drift, as the varying deflection scale now used constitute an extra complication. Suppose a No. 1 has to give 4 minutes left for drift, 5 minutes left for wind, and 7 minutes right for correction of last shot, on a scale of which the divisions are 3's and 15's, what are the odds about his arriving at a correct result?

A minor point to which exception might be taken is the excessive stiffness of the spring under the telescope. In a sight just issued from the Arsenal (No. 139 Stanley) I have found the lateral pressure from the spring on the worm and tangent screw when set at 5 degrees to be 8 lbs. This must surely lead to rapid wear of the tangent screw?

I have endeavored in the two following designs to rectify some of the shortcomings of the present pattern. I do not suppose however that either of them is the best possible solution of the problem.

Fig. 1 represents the present pattern of sight converted by the addition of a Watkin drum and pointer. The tangent screw is of double the present pitch. As the drum is revolved, the pointer, which is attached to the telescope, rises and traces a spiral line upon which the ranges are marked. To save space the extreme ranges from 5200 to 6000 yards are marked as at "a" on the under side of the milled head. The present vernier and scale are not interfered with.

Fig. 2 represents a sight in which the screw impinges on a projection from the telescope, as in the Watkin Range-Finder. To save space, both designs are only graduated to 6000 yards (15"), the extreme limit of the range table. I have shown the drum to the right of the telescope. If, however a new pattern of sight were manufactured it would, I think, be desirable to put the drum to the left of the telescope and pivot the latter directly to the trunnion bar.—*Proceedings of the Royal Artillery Institution.*

MODERN MILITARY RIFLES.

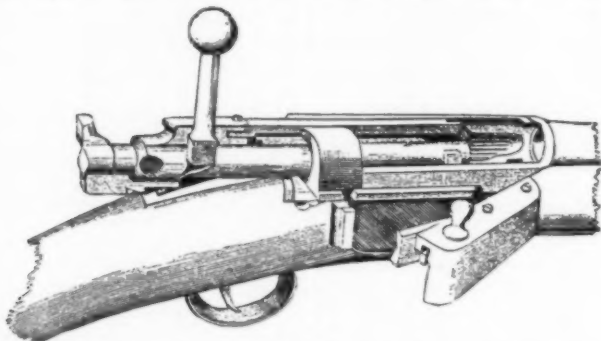
MODERN MILITARY RIFLES.—OCTOBER, 1891. (FROM THE INTELLIGENCE DIVISION, WAR OFFICE, BRITISH.)

Country.	Designation.	Single loader or Magazine.	Weight (about).	Calibre.	Sighted to	System.	Fixed.	Has Magazine a cut off?	Magazine.			Total.	Fillers.
									Number of rounds.				
									In Magazine.	Extra round in chamber.			
Austria.....	Mannlicher.....	M.	10	.315	2,125	Mannlicher	Yes	No	5	0	5	Yes	
Belgium.....	Mausier.....	M.	8	.301	2,125	Lee system	Yes	No	5	0	5	Yes	
Bulgaria.....	Mannlicher.....	M.	9	.315	2,125	Mannlicher	Yes	No	5	0	5	Yes	
China.....	Lee.....	M.	10	.433	.....	Lee system	No	.....	5	1	6	No
Denmark.....	Krag-Jørgensen.....	M.	6	.315	1,450	Lee system	Yes	.....	5	.....	5	Yes
Egypt.....	Martini-Henry.....	S.L.	12	.450	1,450	Lee system	Semi	Yes	8	1	9	No	
England.....	Lee-Metford.....	M.	9	.303	3,500	Lee system	Yes	Yes	8	1	9	No	
France.....	Lebel.....	M.	9	.315	2,187	Tube.....	Yes	Yes	8	1	9	No	
Germany.....	Gras.....	M.	4	.311	2,242	Mannlicher	Yes	No	5	0	5	Yes	
Greece.....	Beaumont-Vitali.....	S.L.	9	.433	1,300	Lee system	Yes	.....	4	1	5	Yes
Holland.....	Vetterli-Vitali.....	M.	15	.407	1,749	Lee system	Yes	Yes	4	1	5	Yes	
Italy.....	Murata.....	M.	8	.312	2,187	Tube.....	Yes	.....	4	1	5	Yes
Japan.....	Kropatschek.....	M.	1½	.315	2,400	Tube.....	Yes	Yes	8	1	9	No	
Portugal.....	Martini-Henry.....	M.	10	.450	1,450	.....	Yes	.....	9	1	10	No
Roumania.....	.....	S.L.	12	.450	1,450	.....	.....	.....	.....	.....	.....	.....
Russia.....	Koka-Mausier.....	In experimen	14½	.395	.....	.....	.....	.....	.....	.....	.....	.....
Serbia.....	Modified Remington.....	S.L.	9	.433	1,190	.....	.....	.....	.....	.....	.....	.....
Spain.....	.....	S.L.	9	.395	1,190	.....	.....	.....	.....	.....	.....	.....
Sweden andNorway.....	.....	S.L.	9	.395	1,190	.....	.....	.....	.....	.....	.....	.....
Switzerland.....	Schmidt-Rubin, 1889.....	In experimental stage	8	.295	2,187	Schmidt...	No	Yes	12	1	13	Yes	
Turkey.....	New Mausier.....	M.	8	.301	.....	New Mausier	Yes	No	5	0	5	Yes
United States.....	.....	In experimental stage	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

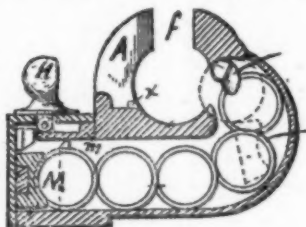
THE KRAG-JÖRGENSEN RIFLE.

The Danish magazine rifle derives its name from the two inventors of its mechanism—Captain Krag, director of the Königsberg (Norway) rifle-factory and the battalion armorer, Jörgensen.

It is a bolt gun with a fixed magazine, containing five cartridges, placed horizontally under and around the left of the receiver into which it opens



on the left side, the walls curving upwards for this purpose. A door placed on the right side of the magazine permits the introduction of cartridges. This door has on its inner face a cartridge guide composed of a lever and a carrier plate against which the cartridges rest. When the door is closed a spring acts on the lever and carrier plate and pushes the cartridges from right to left, feeding them successively into the receiver. A lever, operated by a thumb-lug, on the left side of the receiver, when desired, partially



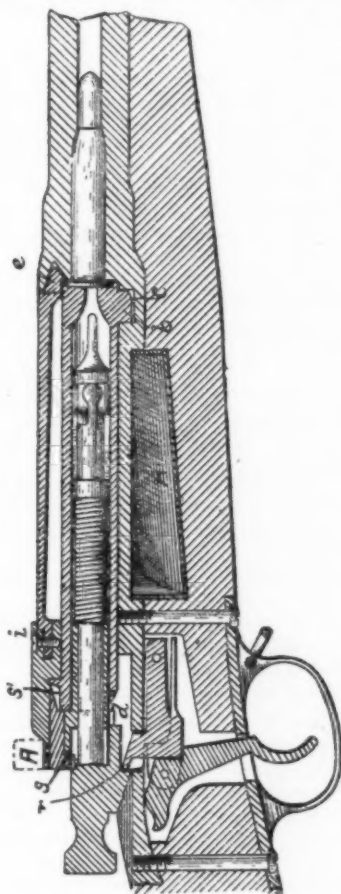
closes the opening from the magazine and shuts off the supply of cartridges. The rifle can then be fed by hand and used as a single loader.

The magazine can be recharged before being completely emptied of cartridges.

The piece is cocked automatically as in the German rifle.

As regards convenience of loading from the kneeling or lying-down positions, the Krag-Jørgensen offers certain advantages over those rifles having the vertical under-feed magazine.

Like the new German rifle, with which it presents many points of similarity, the Krag-Jørgensen has a barrel cover to which the sights are attached. There are in reality two front sights; one placed over the axis of the piece serves for short and middle distances, the other attached to the right side of the upper band answers for long distances.



The leaf of the rear sight bears on its rear face the figures corresponding to middle distances and on its front face those for long distances. This leaf also carries two notches; one over the axis of the piece for middle distances and the other on the right side of the leaf for long distances. The fixed notch corresponds to 200 metres.

The following are the details of the rifle:

Calibre.....	0.315 inch.
Length without bayonet.....	4.36 feet.
Length with bayonet.....	5.21 feet.
Weight with bayonet.....	9.83 pounds.

Rifling:

Number of grooves.....	6
Twist, one turn in....	11.8 inches.

With the new Danish smokeless powder a charge of 33.9 grains has imparted an initial velocity of 1968 f. s. to a bullet weighing 237.6 grains, with a corresponding chamber pressure of 16.4 tons per square inch.—*Revue Militaire de l'Etranger*.
J. C. B.

RECENT MILITARY ARTICLES OF SPECIAL INTEREST.

"Is Our Military Training Adequate?" By Colonel C. W. Larned, Professor, West Point Military Academy. *The Forum*, February, 1892.

"Why the Men of '61 Fought for the Union." By General Jacob D. Cox, U. S. V. *Atlantic Monthly*, March, 1892.

"Combined Military and Naval War Operations." By Rear-Admiral P. H. Colomb, R. N. Lecture of the Aldershot Military Society. November 24, 1891.

"Field Artillery Fire." By Captain W. L. White, R. A. *Proceedings Royal Artillery Institution*, March, 1892.

"Naval Attack of Fortifications." By Captain H. J. May, R. N. *Proceedings Royal Artillery Institution*, January, 1892.

"Memoirs of General de Marbot," *Quarterly Review*, January, 1892.

"Notes sur le Canon de Compagne de l'Avenir, par le Capitaine d'Artillerie Moch." *Revue d'Artillerie*, February and March, 1892.

"Sur la Question des Armes Blanches," par le General Dragomeroff. *Revue du Cercle Militaire*, February 21, 1892.

Reviews and Exchanges.

The Battle of Spicheren.*

THIS is a tactical study of one of the most extraordinary battles in history, and ought to be specially interesting to American officers. The French and Prussian military methods are exhibited in action and the evils and excellences of each stand out clear and distinct. National character, disparity of numbers, inferiority of weapons and such like explanations and excuses are not permitted to obscure the picture. They are treated as known quantities in the problem. The Prussian leaders knew all about the range of the chassepot, and the French knew all about the needle-gun before the battle began. The national character of each was known to the other, and both had the usual opportunities of finding out their adversary's strength. Ignorance on these subjects, if it existed, cannot be pleaded as an excuse for tactical blunders.

In the battle the actors play their parts, each in his own way, and the performance is a fair representation of French and Prussian methods. The author's descriptions are clear and impartial, and the conclusions which he draws are always cautious and generally just. He has no theory to advocate and, seemingly, no prejudices to satisfy. His style is lucid and agreeable though marred somewhat by German designations. The English or American reader must pause and think before he can grasp the meaning of "I. F./39," for instance, no matter how carefully he may have read the preliminary explanations. The maps are good illustrations of the text. They contain nothing but essentials and yet they convey a clear idea of the topography of the field and the movements of troops.

We have said that the book should be specially interesting to American officers. Perhaps we should have said, instructive, or even admonitory. Much of the American military system has been copied from the French. Army administration and tactics are almost exact copies. The same centralization prevails in both armies. Both are under similar bureaucratic bondage. The functions of command have been cruelly curtailed in both. The commander on the spot is rigidly controlled by the commander at a distance. The initiative is discouraged. Independent action is practically prohibited. In the absence of orders opportunities are permitted to slip. In short, the commander on the spot has his hands tied. Now that may have been wise enough at one time. When commanders could see, not only their own, but most of their adversary's force, they could command directly and promptly. But those days are gone. Commanders, supreme and subordinate—except, perhaps, those in the very lowest grades—can no longer see their commands. Some liberty of action must be permitted to subordinates, and the question is: How much? A study of the volume before us will help any anxious inquirer to answer the question. We do not mean that the answer will be found ready made. Perhaps the German commanders had too much

* *The Battle of Spicheren.* By Brevet-Major G. F. R. Henderson, York and Lancaster Regiment. Gale and Polding, London. 6 shillings.

liberty. Certainly the French had too little. But the reader may safely assume that he has the extremes before him, and by watching their workings as exhibited in the battle, he ought to be able to decide.

As to efficiency two pictures are presented. One exhibits an army with "the training, organization and tactics of 1859" (p. 33); the ability to "defile in even lines upon the Champs de Mars (p. 24); the traditions of a glorious past (p. 20), or rather, we should say, their illegitimate offspring, conceit, plenty of courage; some theoretical knowledge; but little practical experience. Without instruction in musketry (p. 25), and utterly ignorant of out-post and reconnaissance work. Such a machine commanded by creatures of the court (p. 24) who had but little knowledge of or sympathy with their men (p. 26), and no practical knowledge of their profession, was simply a magnificent sham, "rotten to the core" (p. 24), and utterly unfit for active service.

The other picture discloses a practically trained army, accustomed to all the operations of war (p. 29), and with recent experience of active service; its tactics—corrected up to date—a fair interpretation of the weapons it carried and its officers, men selected and promoted, not through court favor, or even theoretical knowledge of their profession, but on their "capacity for conducting operations in the field" (p. 30).

These pictures may or may not be overdrawn. We have culled their component parts from different pages, and were conscious at the time of an inclination to discredit their correctness. But after a careful perusal of the work we are forced to admit that the first one at least is fully justified. The author summarizes the evidence on this point (p. 298), and the summary might be increased without difficulty. He says, to prove the general incapacity of French subordinate leaders: "We may instance the failure of the cavalry officers to procure information; the unskilful defense of the homesteads; the sudden and injudicious suspension of the counter-attack on the 39th Fusiliers in the Gifert Wood; the absence of any look-out from the trenches on the Rotherberg prior to their capture by the 74th; the failure to engage, or even to threaten strongly, the right flank of the assailants of Stirling Wendel; the isolated counter-strokes, delivered by successive battalions and unsupported by the artillery, together with the general reckless and uncontrolled fire of both the infantry and artillery.

If that summary of blunders be true, we can understand why Frossard failed to drive Kamecke into or over the Saar. He certainly ought to have done it. He had ample means at his disposal, and he fought on a field of his own choosing. The position had many advantages, and only a few disadvantages worthy of the name (p. 129). Let us examine some of the alleged blunders; space will not permit us to examine them all. Let us take the alleged carelessness which lost him the Rotherburg. The Rotherberg was the key of the position. It commanded all the approaches—commanded them too much perhaps. It presented to the enemy a rugged and almost precipitous face of red sandstone rock 200 feet high (p. 163). Like Bragg's position on Lookout Mountain it seemed unscalable. Its summit was intrenched and occupied by 800 riflemen and 6 pieces of artillery (p. 149).

The assailants of this seeming Gibraltar consisted of one battalion of the 74th—1000 men. They had to traverse 1500 yards of absolutely open ground, under a deadly fire of artillery and infantry, before reaching the friendly shelter of the cliff. They lost heavily, but they reached the shelter,—that is some of them did,—thanks to the covering fire of friendly batteries. And there they lay for over an hour, in the dead space at the foot of the Rotherberg, and the French seemed to have forgotten all about them. But reinforcements reached them at last—one company of the 39th—restoring their

strength to 1000 men, and the ascent of the Rotherberg began. Like flies on a wall they clung to the cliff, each man clambering up as best he could. Discovery meant certain destruction. But there was no discovery. They reached the crest in safety, and the French were reminded of their existence only when the spikes of their helmets appeared on the crest of the parapet. The Rotherberg was won (p. 163).

We ask no more evidence on that point. Carelessness is proved. Curiosity if not caution ought to have induced the defenders of the Rotherberg to keep an eye on that venturesome battalion. But the character of the cliff may have betrayed them into carelessness. Let us have some truer test of their tactical ability. What about their alleged "unskilful defense of their homesteads"? Let us have the facts.

The homesteads consisted of two groups of solid substantial buildings. One group, known as the Baraque Mouton, was a farm house, granary and out buildings, the other, called the Golden Bremm, consisted of two substantial buildings enclosed by a wall eight feet high. It was a tavern. They stood on opposite sides of the highway from Saarbrücken to Metz, and were about 400 yards apart. If they had been built with a view to mutual support against an attacking force, they could not have been placed to better advantage. They were the outposts covering the French left, and might have been made the Hougomont of Spicheren (p. 125).

The homesteads were occupied by the First Battalion of the French 76th, supported by a battalion of the 66th, conveniently posted in the Spicheren road near by, and flanked by three batteries of artillery at Stiring Wendel less than 2000 yards from the Golden Bremm (p. 191).

To understand the situation correctly without a map, it is only necessary to say that the road from Saarbrücken to Metz here traverses a narrow valley between the plateau of Spicheren on the east and Stiring Copse on the west, and that the homesteads are near the narrowest part of the valley. On the French side the valley is closed by the village of Stiring Wendel and on the German side by the Galgenberg, each about 2000 yards from the homesteads. The French had three batteries at Stiring Wendel; the Germans four on the Galgenberg; but only two of the latter could be spared for operations on the homesteads.

Any column advancing from the Galgenberg to attack the homesteads would be exposed to a fire in front from the Stiring Wendel batteries and a fire in flank from two batteries on the Spicheren plateau.

The homesteads were important posts to the French. To hold them, therefore, was a prime necessity. They closed the valley against the Germans, and effectually covered the French left. To take them therefore, was an equally prime necessity to the Germans.

The German columns of attack consisted of six companies of infantry. They advanced, suffering severely, to a point 400 yards from the Golden Bremm, where a little knoll gave them some shelter. Here they were divided into two columns, one to assault the Golden Bremm, the other the Baraque Mouton, 400 yards farther up the valley. Meantime the German batteries on the Galgenberg were preparing the homesteads for assault.

When everything was ready the columns advanced over the knoll and, driving the French skirmishers before them, rushed upon their objectives. It seems to have been a foot race, this for 400 yards; that for 800.

The French garrisons had found the homesteads rather uncomfortable quarters during the bombardment, and had prudently withdrawn to a safe distance while it was going on—which was proper enough. But they tarried in the safe place a little too long. Hence the foot-race. The Germans reached the homesteads almost as soon as they did, and although the fighting in and about the buildings was very creditable, the

French were forced to yield. The battalion in reserve failed to come to their assistance, and they were fairly forced out of the homesteads.

Then was the moment for a counter-stroke. The Germans had had a long race and a hard struggle, lasting together almost half an hour, and were in no condition to resist an attack by fresh troops. And the fresh troops were there for that very purpose; but no counter-stroke was delivered. In a very short time a counter-stroke would have been a costly undertaking. In spite of the hail of bullets showered upon them, the Germans had, in a very short time, prepared every building and garden-wall for defense, a precaution which the French officers had never dreamt of, and the Hougoumont of Spichenen was irretrievably lost (p. 193).

There is only one comment to make on that story. The French officers were merely commissioned shams; brave, but conceited military imbeciles. Perhaps they feared that to strengthen their position against Prussian troops might be mistaken for cowardice. They had no direct orders to do so, and they had never mastered the real meaning of their commissions. The commander of the supporting battalion, too, had neither order nor invitation to "pitch in." Why should he move? He was "in support" and ready to act when called upon to do so. But to take the initiative, to exercise his judgment, might be considered an attempt to steal the laurels from a comrade's brow. And that he could not do. His training and his honor forbade.

We need no further evidence. The pictures drawn by the author are true and under, rather than over-drawn. He has earned the thanks of the profession. His little volume stands well in advance of tactical text-books, so far as teaching power is concerned. Let us have some more "studies" on the same lines.

JAMES CHESTER,

Captain 3d Artillery.

The Afghan Wars.*

Mr. Archibald Forbes shows the same graphic power as a historical writer, as he evinced as a war correspondent.

His *Afghan Wars* affords interesting reading to the military student, not only from his clear descriptions of four interesting campaigns but from his incisive criticisms and mastery of the subject.

We have had four notable misfortunes in our Indian wars, the so-called massacres of Crawford, Dade, Fetterman and Custer, but they were small affairs compared with the loss of an entire British army of 4500 men and 1200 camp followers near Cabul in 1832.

The armies of Britain have won a remarkable proportion of battles fought, yet they have sustained some humiliating defeats. From our own Indians (Braddock's defeat), from the Sikhs at Chillianwah, from the Whahabees in Arabia, and the Boers in South Africa. In addition to these Mr. Forbes describes two in his *History* with what the English public must consider surprising frankness. Yet—"if he nothing extenuates, he sets down naught in malice."

There is, however, one inference of the writer with which many military men will take issue.

He asserts that the *Afghans* did not fight as well in the campaigns of 1878-80 as in those of 1839-42. He attributes this to the fact, that their forces in the last war were organized and drilled as European armies and argues that they would have done better had they fought only as irregulars and in guerilla warfare.

It is not apparent from the writer's own narrative, nor from the statements of other

* *The Afghan Wars*. By Archibald Forbes, LL.D. Charles Scribner's Sons, New York. \$1.75.

authorities, that the Afghans fought any better in the first war than in the second. The explanatory fact is, that the British force in the first war fought infinitely worse.

It was fought under the management or rather the mismanagement of the Old East India Company. The invading force was poorly organized, miserably commanded and largely made up of very inferior Sepoys. The Duke of Wellington ascribed their disaster: To their making war with a peace establishment, fighting without a base and in a country too poor to support war; taking Sepoys from a hot to a cold climate; needlessly exposing magazines to capture, and to the folly of political agents.

It is worth the while of every statesman and soldier to consider well the causes of failure mentioned by the Duke. But Mr. Forbes gives another sufficient cause for disaster. The Hillmen were armed with a longer-ranged gun than the Elphinstone infantry, just as the Winchesters of the Sioux were better than the carbines of our cavalry at the Little Big Horn.

At the Maiwand, Burrows' army was defeated by the superior artillery fire of the enemy. Evidently modern organization and equipment were no detriment to them there.

At the assault on the Asmai ridge near Cabul, Mohammed Jan adopted the style of fighting prescribed in our new tactics; that is, open order and successive rushes;—and the Afghans won the day.

Why, then, it may be asked, with superior numbers did they not win the campaign? The cause is evident. They could not keep a large force together for any length of time without pay, food and forage. They live, as they say, on the roof of the world. There are no roads of any kind in that region. Supplies of all kinds are carried on the backs of camels. Whether successful or not their armies must disband every few weeks.

General Roberts proved himself a very able general, yet he was evidently well pleased to get his army safely over the Indus.

THOMAS M. ANDERSON,
Colonel 14th U. S. Infantry.

Lectures on Explosives.*

This work will doubtless be appreciated by artillery officers, as it should be, not only on account of its intrinsic interest and undoubted merit, but also as an indication that the ultra-conservative methods which have heretofore prevailed at the Artillery School are gradually disappearing, and that some opportunity is afforded for special study and original investigation.

That the old methods are not entirely a thing of the past is partly shown by the scope of these lectures, which, in the earlier chapters, embrace such elementary subjects as the law of multiples, valency and stoichiometry, while in Lecture IX. is given a summary of the researches of Nobel and Abel, Berthelot, Debus and others on the products of the explosion of gunpowder.

It may be doubted whether the "student officer" who needs the instruction conveyed by the first two lectures would be able to appreciate that of the ninth—or even whether he is a proper candidate for laboratory instruction at all.

But doubtless the limitations imposed by a cut-and-dried course are the cause of the apparent inconsistency.

The author modestly disclaims originality in the lectures, giving full credit espe-

* *Lectures on Explosives.* By 1st Lieutenant Willoughby Walke, 5th Artillery. Artillery School Press, Fort Monroe, Va.

cially to the well-known labors of Professor Monroe in this direction, but he is certainly entitled to full credit for having developed a coherent course of instruction in a comparatively new field at the School.

The service tests of the more important explosives are briefly and clearly given and the work at the Artillery School laboratory ought in future to be both interesting and profitable.

Such work as that of Lieutenant Walke is deserving of the highest appreciation and commendation.

T. C. PATTERSON,
1st Lieut. 1st Artillery.

Barracks, Bivouacs and Battles.*

"Barracks, Bivouacs and Battles" is a collection of sketches, anecdotes and tales from the delightful pen of the war correspondent, Archibald Forbes.

The various numbers of the volume are drawn from the author's experience in a large number of important campaigns, and bring out in a charming way the humor, pathos, heroism and tragedy in the life of the British soldier. To the military reader, the article on Fire Discipline, expressing, as it does, the views of one who has had almost unparalleled opportunity for observation in the armies of different nations, will probably be of greatest interest. In it he unfavorably contrasts the cover-seeking open order of fighting taught in the British army with the bolder and apparently more fearless attack of the Prussian soldier.

One striking statement that he makes sets one to thinking, and may be repeated: "My own belief, founded on some experience of divers nationalities in war-time, is that most men are naturally cowards."

Such a statement made by one who has seen the armies of eight powerful nations in battle demands consideration, and the reader is relieved by noting the explanation given that in many cases, will and pride combine to keep down the naturally cowardly predilections.

E. M. L.

Journal of the United States Artillery.†

We have to welcome an addition to current military literature in the shape of a journal devoted to the technicalities of scientific artillery, and issued under the auspices of the School Authorities at Fort Monroe, Va.

The articles calling for particular notice are: Range Tables for the 12-inch Cast-Iron B. L. Mortar, by Captain James M. Ingalls, 1st Artillery; Our Artillery Organization, by Lieutenant W. A. Simpson, Adjutant 2d Artillery, and The Effect of Wind on the Motion of a Projectile, by Lieutenant John W. Ruckman, 1st Artillery.

If the excellence of the journal is maintained in keeping with the appearance of this first number, we may hope for much pleasure and profit from the perusal of its pages.

J. C. B.

Index to the Changes in the Army Regulations.‡

The Fifth Series of this excellent index, issued March 1, 1892, bears the impress of the same careful endeavor which have characterized its predecessors whose accuracy

**Barracks, Bivouacs and Battles*. By Archibald Forbes, LL. D. Macmillan & Co., London & New York.

†*Journal of the United States Artillery*. Published by authority of the Staff of the Artillery School, Fort Monroe, Va.

‡*Index to the Changes in the Army Regulations*, Fifth Series, March 1, 1892. By Captain William Baird, 6th U. S. Cavalry. Chapman & Taylor, Washington, D. C.

and usefulness are so well known as to call for no other comment than that contained in the notice of issue.

We commend Captain Baird's "Index to the Changes in the Army Regulations" to all officers, especially to those of the line to whom the work must prove a valuable saving of time and patience.

Autobiography and Personal Reminiscences of Major-General Benj. F. Butler.—Butler's Book.*

This work is quite what the latter part of the title would indicate. A more thoroughly individual book—one that fairly bristles with the idiosyncrasies of the author—it would be hard to find.

The many eminent and important positions held by General Butler renders what he has to say both interesting and valuable, though this last quality is much marred by an intense egotism and the prejudice displayed towards most of the persons with whom he came in contact.

The typography is good but the quality of the illustrations is out of keeping with a book of such importance.

Extracts, Small Arms Firing Regulations.†

This is an excellent little volume for handy reference, compiled from the Small-Arms Firing Regulations, consisting of questions and answers on all points that arise in connection with target practice of small arms.

The matter is well arranged and the book of a size convenient for the pocket.

ARTICLES ACCEPTED FOR THE JOURNAL.

Practical Working of Rifle Practice against an Enemy, By GEN. GEO. W. WINGATE.
The Organization of Militia Defense for the United States,

By CAPT. JAMES CHESTER, 3d U. S. Artillery.

Skobelev's Last Campaign, - - - By CAPT. CHAS. H. CLARK, Ord. Dep't U. S. A.
The Physical Training of the Enlisted Man,

By LIEUT. G. F. E. HARRISON, 2d U. S. Artillery.

Smokeless Powders, - - - By CAPT. CHAS. H. CLARK, Ord. Dep't U. S. A.

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By CAPT. W. V. RICHARDS, 16th U. S. Infantry.

Civil War in Chili, - - - By CAPT. J. J. O'CONNELL, 1st U. S. Infantry.

Our New Drill Regulations for the Infantry,

By LIEUT. C. J. CRANE, Adjutant, 24th U. S. Infantry.

* *Autobiography and Personal Reminiscences of Major-General Benj. F. Butler*. A. M. Thayer & Co., Boston, Mass. 1892.

† *Extracts, Small Arms Firing Regulations*. By First Lieutenant C. L. Collins, 11th Infantry, Inspector Small-Arms Practice. Department of Arizona, Los Angeles, Cal.



Prize Essay—1892.

I.—The following Resolution of Council is published for the information of all concerned :

Resolved, That a Prize of a Gold Medal of suitable value, together with a Certificate of Life Membership, be offered annually by THE MILITARY SERVICE INSTITUTION OF THE UNITED STATES for the best essay on a military topic of current interest ; the subject to be selected by the Executive Council and the Prize awarded under the following conditions :

1. Competition to be open to all persons eligible to membership.*
2. Each competitor shall send three copies of his Essay in a sealed envelope to the Secretary on or before October 1, 1892. The Essay must be strictly anonymous, but the author shall adopt some *nom de plume* and sign the same to the Essay, followed by a figure corresponding with the number of pages of MS.; a sealed envelope bearing the *nom de plume* on the outside, and enclosing full name and address, should accompany the Essay. This envelope to be opened in the presence of the Council after the decision of the Board of Award has been received.
3. The prize shall be awarded upon the recommendation of a Board consisting of three suitable persons chosen by the Executive Council, who will be requested to designate *the Essay deemed worthy of the prize*; and also in their order of merit those deserving of honorable mention.
4. The successful Essay shall be published in the Journal of the Institution and the Essays deemed worthy of honorable mention, shall be read before the Institution, or published, at the discretion of the Council.
5. Essays must not exceed twenty thousand words, or fifty pages of the size and style of the JOURNAL (exclusive of tables).

II.—The Subject selected by the Council at a meeting held Nov. 27, 1891, for the Prize Essay of 1892, is

"THE ARMY ORGANIZATION, BEST ADAPTED TO A
REPUBLICAN FORM OF GOVERNMENT, WHICH
WILL ENSURE AN EFFECTIVE FORCE."

III.—The gentlemen chosen by the Council to constitute the Board of Award for the year 1892, are :—

SENATOR CHARLES F. MANDERSON,
SENATOR REDFIELD PROCTOR,
GENERAL JOHN M. SCHOFIELD, U. S. A.

WM. L. HASKIN,
Secretary.

GOVERNOR'S ISLAND,
November 28, 1891.

* "All officers of the Army and Professors at the Military Academy shall be entitled to membership, *without ballot*, upon payment of the entrance fee. Ex-officers of the Regular Army of good standing and honorable record shall be eligible to full membership of the Institution *by ballot* of the Executive Council.

"Officers of the United States Navy or Marine Corps shall be entitled to membership of the Institution *without ballot*, upon payment of the entrance fee, but shall not be entitled to vote, nor be eligible to office.

"All persons not mentioned in the preceding sections, of honorable record and good standing, shall be eligible to Associate Membership *by a confirmative vote* of two-thirds of the members of the Executive Council present at any meeting. Associate Members shall be entitled to all the benefits of the Institution, including a share in its public discussions, but no Associate Member shall be entitled to vote or be eligible to office."



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It is the strongest. A rounded teaspoonful of Cleveland's Baking Powder does more and better work than a heaping teaspoonful of others. A large saving on a year's baking.



Cake and other articles of food keep moist and fresh and do not dry up as when made with baking powders containing ammonia or alum.

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Cleveland's is the baking powder used in the U. S. Army.



Announcements.

I.

THE formation of a branch of the Military Service Institution at Los Angeles, California, on the 17th day of February, 1892, is hereby made known to the Institution at large.

The Branch was organized with General A. McD. McCook as presiding officer (who becomes *ex officio* a vice-president of the M. S. I.), and Lieutenant J. E. McMahon as secretary (who becomes *ex officio* a corresponding secretary of the M. S. I.).

J. M. SCHOFIELD,

Major-General, U. S. A.

President Mil. Ser. Institution.

WM. L. HASKIN,

Major 1st Artillery,

Secretary Mil. Ser. Institution.

II.

At a general meeting of the Military Service Institution held on Friday, March 11, 1892, at Governor's Island, N. Y.; pursuant to notification duly given in previous numbers of the JOURNAL, the proposed amendment to the Constitution was voted upon; and as more than the required two-thirds of those voting, voted in the affirmative, the amendment was declared carried.

The amendment—which will now take its place as an addition to Sec. 6, Article IV.—reads as follows:—

“When any member shall have been dismissed from the Army, Navy, or Marine Corps, by order of the President, or the sentence of a court-martial, or shall have been convicted by a civil court of a felony, his membership shall be forfeited and his name dropped from the rolls of the Institution.”

The Military Service Institution.

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Resident Vice-Presidents.

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Bvt. Brig.-Gen. T. F. RODENBOUGH, U. S. A.

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Lieut. J. C. BUSH, 5th U. S. Artillery.

Asst. Secretary and Vice-Treasurer.

Lieut. GUY HOWARD, 12th U. S. Infantry, A. D. C.

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Term ending 1897.

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HAMILTON, JOHN, Colonel, U. S. A.
HUGHES, R. P., Colonel, Insp.-General.
RUGGLES, G. D., Col. Adjt.-Gen'l's Dept., B.-G.
SMALL, M. P., Lieut.-Col. Sub. Dept., B.-G.
WOOD, E. E., Captain 8th U. S. Cavalry.

Term ending 1895.

ABBOT, H. L., Col. Corps Engineers, B.-G.
BARR, T. F., Lieut.-Col. D. J. A. G.
HYDE, J. McE., Capt., Q. M. Dept.
LORD, R., Lieut.-Col. 1st U. S. Artillery, Co.
NOWLAN, H. J., Capt., 7th Cav.
WETHERILL, A. M., Capt., 6th U. S. Infantry.

Term ending 1893.

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COL. SMALL.
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MIDDLETON, J. V. D., Major Med. Dept.
OTIS, E. S., Col. 22d U. S. Infantry.
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(1) "All Officers of the Army and Professors of the Military Academy shall be entitled to Membership *without ballot* upon payment of the Entrance Fee."

(2) "Ex-Officers of the Regular Army, in good standing and honorable record, shall be eligible to full Membership of the Institution, *by ballot* of the Executive Council."

(3) "Officers of the U. S. Navy and Marine Corps shall be entitled to Membership of the Institution, *without ballot*, upon payment of the Entrance Fee, but shall not be entitled to vote nor be eligible to office."

(4) "All persons not mentioned in the preceding sections of honorable record and good standing, shall be eligible to *Associate Membership* by a *confirmative vote of two-thirds* of the members of the Executive Council present at any meeting. Associate Members shall be entitled to all the benefits of the Institution, including a share in its public discussions; but no Associate Member shall be entitled to vote or be eligible to office."

Membership dates from the first day of the calendar year in which the "application" is made, unless such application is made after October 1st, when the membership dates from the first day of the next calendar year.

"An Entrance Fee of Five Dollars (\$5) shall be paid by each Member and Associate Member on joining the Institution, which sum shall be in lieu of the dues for the first year of membership, and on the first day of each calendar year, thereafter, a sum of not less than Two Dollars (\$2) shall be paid *an annual dues*. Annual dues commence on January 1st in each year."

NOTE.—Checks, Money Orders, or Registered Letters should be drawn to order of, or addressed to, "The Military Service Institution," Governor's Island, New York Harbor. Changes of address should be reported promptly.



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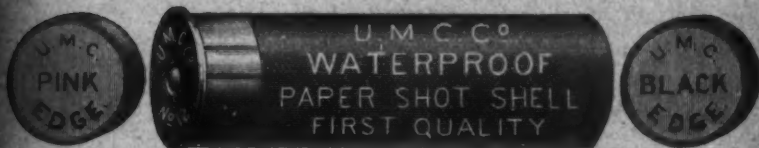
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THE SECOND REGIMENT OF CAVALRY.

I.

(1836-65.)

BY MAJOR ALFRED E. BATES,* PAY DEPARTMENT.

REGIMENTS, like individuals, have characteristics peculiar to themselves. One is famous for the smart, soldierly appearance of its officers and men on all occasions and under the most trying circumstances. You cannot tell how they do it, but they always seem to be ready for dress parade and inspection. They are known as "The Dandy Regiment," or "The Band-box Brigade," an epithet which becomes complimentary because it is associated with their well-earned reputation for gallantry. Another becomes famous for its marching qualities and for generations maintains its reputation for measuring greater distances in less time than any other. Then in every service there are "The Slow and Heavies," who, somewhat late in getting into action, never get out, as they are alike unmoved by shot or shell or joke. Nor should we omit the regiment with the Milesian quality of never enjoying life save when in a row with some one.

It may not be out of place to note here that different branches of service bring out different traits of character. We are accustomed to think of the steady foot-soldier; the scientific artillerist; and, as for the cavalryman, perhaps his conventional qualities are best defined by Professor Mahan in his "Outposts" when he says: "The Hussar! that epitome of military impudence of the tavern, who should possess these qualities, in a sublimated form, on the field of battle."

I am sure that no one who has served with the cavalry of ante-bellum days, can read this definition of the Hussar without believing that the Professor must have known the old 2d Dragoons when he wrote it. As individuals and as a regiment, it was that "epitome of military impudence" whether in the parlor, in the tavern, or on the field of battle. Mounted on his well-groomed horse, equipments in perfect order, sitting as if he would be out of place anywhere else, cap a little on one side, with a twinkle in his eye, and the suspicion of a smile about his mouth, our Dragoon reported himself ready to go to —, or any place you might lead him.

"Like master, like man." And we must go back to the early years of the regiment if we would find the reason why. After the settlement of our troubles with Great Britain in 1815, our little army was reduced and re-organized so that we had but four regiments of artillery and seven of infantry scattered along the sea-board from Maine to Florida, along the

* Late Captain 2d U. S. Cavalry.

Canadian border and the Great Lakes, and occupying a few scattered posts along the western frontier which was at that time far to the east of the Mississippi River. The stream of emigration having commenced, the pioneers rushed to take possession of the rich lands acquired from Spain in the South, and by the Louisiana purchase in the South and West. These lands were occupied by tribes of Indians, who objected to the intrusion and made manifest their objection by killing the intruders. It was the old trouble—begun with our first settlement on the Atlantic Coast and not quite ended yet. It was the duty of the Army then, as it has been ever since, to drive back the native and hold the country for the occupation of the white man; for this purpose mounted troops were necessary and, in 1833, Congress authorized the organization of the 1st Dragoons, and in May, 1836, added another regiment which was called the Second Dragoons. The companies of this regiment were organized in New York, Baltimore and St. Louis, and the personnel both of officers and men was representative of the whole country.

Soon after the passage of the act authorizing the organization of the Second Dragoons, the following appointments were announced :

COLONEL

DAVID E. TWIGGS.

LIEUTENANT-COLONEL

Wharton Rector.

1. William Gordon,
2. John Dougherty,
3. John F. Lane,
4. James Ashby,
5. Jonathan L. Bean,

FIRST LIEUTENANTS

1. Thornton Grimsley,
2. Theophilus Holmes,
3. Horatio Groome,
4. Thomas S. Bryant,
5. John Graham,
6. Townshend Dade,
7. Erasmus D. Bullock,
8. Marshal S. Howe,
9. Charles Spalding,
10. James W. Hamilton.

CAPTAINS

MAJOR

Thomas T. Fauntleroy.

6. Stinson H. Anderson,
7. William W. Tompkins,
8. Henry W. Fowler,
9. Benjamin L. Beall,
10. Edward S. Winder.

SECOND LIEUTENANTS

1. William Gilpin,
2. William H. Ward,
3. George Forsyth,
4. Croghan Ker,
5. John H. P. O'Neale,
6. John W. S. McNeil,
7. Zebulon M. P. Maury,
8. Seth Thornton,
9. Charles E. Kingsbury,
10. Charles A. May.

Wharton Rector declined the appointment of Lieutenant-Colonel, and Major William S. Harney, Paymaster, was promoted to the vacancy.

First Lieutenant Lloyd J. Beall was announced as Adjutant.

David E. Twiggs of Georgia, the first Colonel, unquestionably gave a tone to the regiment, which, subsequently accentuated by Harney and Cooke, gave point to the answer to many a query, "Oh, *that's* a Second Dragoon." He was somewhat of a martinet but in all things a soldier. The key-note to his discipline was this: *on duty*, no excuse, no relaxation, no

explanation for failure; *off duty*, anything for amusement, and especial encouragement given to manly sports. The best rider, the best jumper, the best boxer, the cleanest soldier—had a claim for clemency from the commanding officer that often saved the soldier from deserved punishment for excessive dissipation. Associated with its first Colonel were some subordinate officers who also did much to encourage this spirit in the regiment. Among these none were more prominent than Captain Beall, familiarly known to the army as "Old Ben Beall," of whom at the close of the Florida War General Worth officially reported that he "has met the enemy in this contest, oftener, perhaps, than any other officer—is brave and generous." The foe overcome, the tedious trail retraced, horses and men cared for, and where was the man who made social history more racy or gave entertainment more varied than "Old Ben"?

Besides these individual influences operating upon the newly organized regiment, there was the kind of service on which it was engaged. Immediately after its organization, the assembled troops started on their journey to the Everglades of Florida. There in those deadly swamps, surrounded by a wily and often invisible foe, the "Second" received its first training in endurance. Theirs not the grand privilege of doing and dying for their country, with banners flying, bugles sounding, and comrades cheering, while boot to boot they rode upon the enemy. There was nought of glory here, nor correspondents of pictorial papers ready to make them immortal. There was but the lonely swamp; the small detachment guided by the more or less friendly savage; the fearful strain of physical endurance; the sharp, short, unrecorded fight; the return, the struggle with, and perhaps death by fever. The history of one scout is the history of many until at last the foe is conquered or killed, and what is left of the Regiment moves off to other fields—no longer a *new* regiment, but a proud, saucy, devil-may-care lot of troopers, thoroughly cemented together by blows and blood and ready to give and take wherever an enemy of their country is found.

The result of the service in Florida was satisfactory to the Government, and cost the regiment two officers and twenty non-commissioned officers, musicians and privates killed in action, and five officers and one hundred and ninety-two non-commissioned officers, musicians and privates, who died from diseases incident to service. Among those who at the close of the Florida War had become prominently identified with the regiment, was the late General Harney, its first lieutenant-colonel. He had gone with it to Florida and there, under his direction, the regiment had done some of its most noteworthy service, against the Seminoles; as it did in after years in the West against Mexicans and the Indians of the Plains. General Harney was a very picturesque soldier. Standing something over six feet in height, he was a veritable Apollo in form, and a giant in strength, excelling nearly all of his contemporaries in all qualities pertaining to physical manhood. As he subsequently succeeded to the colonelcy of the regiment, perhaps his influence and characteristics were more deeply impressed upon it than were those of his predecessor. Harney was thoroughly a dragoon. He would have admitted, doubtless, that there was a necessity for artillery and artillerymen in an army, and even infantry could be employed to advantage in

rough country, but it was the "dragoon bold" who discovered the enemy, charged the enemy, captured or killed the enemy, and only after the action was over and the enemy turned over to the infantry guard, would he rest from a well-earned victory. From Florida to Mexico, with but a little breathing spell in Mississippi and Texas, our brave dragoons carry their fluttering guidons. On the Rio Grande (April 25, 1846) they met for the first time a civilized foe, and as they meet they dazzle the country with the brilliancy of their deeds. The fields of Palo Alto and Resaca de la Palma are fought, and the names of May and Graham and Sacket and others of the 2d Dragoons become familiar household words all over the country. The reputation gained upon those fields was but the beginning of a series of successes with the noble Army of Occupation under Taylor, and afterwards under the old hero Scott, from Vera Cruz to the City of Mexico.

Harney was one of the most conspicuous figures in Mexico. Sumner, one of the heroes of a later and greater struggle, won golden laurels for himself, which he was to wear until in ripe old age he died in harness. The other survivors of the Florida swamps gave fresh examples of their prowess. The captains and lieutenants found their names in either General Order, list of casualties or of brevets. Inge fell at Resaca, Stevens at Matamoras, Hill at Puebla and gallant Seth Thornton met a soldier's death under the walls of the Mexican capital—marking in his own person the opening and the closing actions of the campaign.

The romantic "War with Mexico" ended, the 2d Dragoons (1848) came back to take its place again facing the Indians. The poor red-skin devil had been driven from point to point, cheated in treaty after treaty, moved from one reservation to another, until there was no hostile element left east of the Mississippi River, and our line of outposts extended from the Red River of the North to Galveston on the Gulf. East of this line the defenseless settler was coming on faster and faster, and west of it were thousands of savages determined to dispute any farther aggression upon their territory. The few rude posts called "forts," located far apart along this line of more than two thousand miles in length, were garrisoned by a few regiments of troops, one of which was the 2d Dragoons. Between 1848 and 1861, they rode back and forth along this dreary route. To-day pursuing the swift Apache and Comanche over the hot, arid, staked plains of Texas or New Mexico; then, as quickly as horses could carry them, rushing off to the frozen fields of Nebraska to struggle through an Arctic winter, fighting the powerful Sioux of the North. Standing between hostile political camps of their countrymen in Kansas, they preserve the peace because neither faction dare attack or oppose them, while both sides are obliged to acknowledge their impartiality and patriotism.

During these days another great cavalryman has taken his place at the head of the regiment. Philip St. George Cooke has taken command. If in the swamps of Florida, the fields of Mexico or the plains of Texas, there has been little time to devote to the finer points of drill, the defect is remedied now. On the prairies of Kansas, with new mount and splendid equipment, Colonel Cooke gives a new impetus to the military detail of the regiment. He cannot add to its *esprit de corps*. There have grown upon

it no excrescences for his keen knife to lop off, but he can and does give them a grand drilling, the like of which they have never had before. For the first time in many years, from four to six companies of the regiment were together at Fort Riley in 1856-57, without a war of some kind to engage their attention. There was no nonsense about the old soldier who had them in charge, and the young officers joining there, learned lessons they found invaluable, and which a few years later, upon the fields of Virginia, enabled them to add fresh laurels to the regimental wreath.

A few short years of pleasant garrison life in Kansas, and (1856) "once more, my men, into the saddle and show the world what you can endure and live." 'Tis the Mormon, that religious barnacle upon the western civilization of the nineteenth century that demands your attention now. Secure in the fastness of the Rockies, in the valley which he has reclaimed and converted from a wilderness to a garden, their prophet, priest and king defies the power of the Government, and practically proclaims his independence. It is unnecessary for the soldiers to analyze too closely the history of the Mormon War. Whether it was, in whole or part, a move in the great game of conspiracy then being played; whether it was a shrewd effort on the part of Brigham Young to get a market for the agricultural products of the Mormons; whether he actually supposed that his position was strong enough to enable him to defy the Government; or whether it was a part of all of these causes, matters not to the Dragoon. "His not to reason why," and he did not attempt it.

In the month of August, 1857, the regiment started on its march overland for Utah. The route was long and weary, but that did not matter. They were used to that, but when the early snows fell upon them at South Pass and the mercury went down into the bulb of the thermometer to keep from freezing, and the starved horses laid down to die on the trail, the light-hearted Dragoon, like Mark Tapley at Eden, began to think there might be some credit in being jolly. Jolly he was not always, but the survivors of that terrible winter all testify to the invariable cheerfulness and pluck of the soldiers; on foot, half starved and more than half frozen, they struggled on as far as Fort Bridger, and, there, passed a winter of suffering.

The casualties reported from 1840 to the outbreak of the Civil War were: Killed, 4 officers and 47 men; wounded, 8 officers and 84 men.

Then was reached the climax in the life and history of the regiment. Those gallant, simple-minded soldiers were called upon to meet a question of *divided* duty. Heretofore they have ridden and fought, worked and starved with but one thought, one aim—Duty. Had you asked the officer if the cause was just, he might have said, "I do not know, here are my orders." Had you said to the soldier, "You would not fire on your own people, would you?" he would probably have answered with the old artilleryman in Pittsburg in '77, "I don't know sir, *that* depends upon the Captain." Now, however, the Captain is troubled. If from the South, he has been taught to believe that the Union is a voluntary compact on the part of each State, from which it may withdraw. If this State withdraws or secedes, as a citizen of the State he will owe his allegiance to her and not to the Union with which she has severed her connection. On the other hand, he has fol-

lowed the dear old flag from Florida to Utah, sprinkling it with his blood in many a combat, and how can he ever fight against it? How he hopes and prays that his State will not go; that he will not be obliged to make the choice. But the time comes and he must choose. As he reads and re-reads the letters from the dear ones at home, urging him to come to their protection, and looks at his brothers-in-arms from whom they want protection, who will condemn him whichever way he goes? We have his history for years before and we have all known him for years since. Little more need be said. On the Confederate side "Dick" Anderson and Hardee became lieutenant-generals; Pegram, Sibley, Robertson, Geo. Anderson, Armstrong, Stuart and Field were major generals.

The crisis has come and passed, and another year (1862) finds the regiment in Virginia, a grand old Virginian still its colonel. The vacancies are filled and the regiment is ready once more to enter the lists. In a sketch like this it is impossible to follow in detail its history through such a period as that from '61 to '65. However, it seems proper to take notice of the personnel at the commencement of, what an ancient dragoon always called, "our late lamented circus." The regiment in 1861 was twenty-five years old, and its officers had received their training in its school. Whatever they became as soldiers in the great war, then commencing, they owed to that training. Many were detached from the organization at the commencement of hostilities. Cooke was made a brigadier-general in the regular establishment; Wood, Palmer, Davidson and Pleasanton were starred and assigned to command volunteer troops; while Buford, who was perhaps more than any other a typical 2d Dragoon, first commanded the Regular Brigade and afterward the First Cavalry Division of the Army of the Potomac. One feels inclined to stop at this period, and enter into detail. There is so much of brilliancy in every day life, from the time when Hooker organized the cavalry, until when our horsemen with characteristic impudence hold the way against Lee's retreating army at Appomattox, that a "sketch" seems inappropriate. The scholars of that 2d Dragoon school are now operating on the great war theatre, where history is being made. Some have gone far to the front, like Buford, and Merritt, and Sanders, but they have at their elbows such lieutenants as "Jake" Gordon, Rodenbough, Leoser, Harrison, Blanchard and Dave Gordon, as well as those splendid fellows whose military cradle was a dragoon saddle, like Ball, Mix, Wells, Spaulding, Dewees and Quirk, whose feats on the field of Beverly Ford, alone, should immortalize them. While these old soldiers are still with the regiment, there is hardly an army in the country which has not a brigade, division or corps commanded by some one of those detached. Pleasanton, Graham, Buford and Merritt in the Army of the Potomac, Wood and Davidson in the West, Palmer in North Carolina, while "Doc" Sanders is the hero of the day at Knoxville, where he lost his life. The regiment paid fearfully for its share in the struggle for the Nation; its Roll of Honor is long. Buford, Sanders, McQueston, Canfield, Lawless, McMasters, Selden—all dead on the field of battle. Others survived the War and dropped off one by one, leaving but few of that gallant band remaining. Of them, Harrison—popular, brave, conscientious—is now a citizen in that peaceful city, Philadelphia; Roden-

bough, who made much history for the regiment then, now uses the arm left from that glorious charge at the Opequan, in preserving it; and Leoser, "the cool captain," whose iron frame shows little evidence of war wounds and prisons, is now residing in New York. Space does not permit one to follow individuals farther. The list of combats from 1861 to 1865 shows what the regiment accomplished. Always in front, under Pleasanton, Buford or Merritt, with Stoneman or the brilliant Sheridan, from Bull Run to the Appomatox, there was hardly an affair of any importance at which it was not represented. Its losses during the War were: Killed, 5 officers and 60 men; wounded, 20 officers and 206 men.

II.

(1866-'91.)

BY CAPTAIN EDWARD J. MCCLERNAND, SECOND CAVALRY.

How well the work prior to the close of the Civil War was done, is set forth in the preceding pages. The period there treated furnishes the most glorious pages in our history, but the duty performed was not more arduous than that which has since devolved upon the regiment.

The roster of the officers has been changed since the regiment participated in those stirring campaigns of the Army of the Potomac, and now but one of those gallant men remains with us—Lieut.-Col. D. S. Gordon, who has served continuously in the Second Cavalry since his appointment as a second lieutenant, April 26, 1861.

Within a month after reaching Leavenworth, November, 1865, we find troops marching for the (then) frontier posts of Riley, Kearny, Hays, Lyon, Harker, Dodge, Larned and Wallace. They found the winter of 1865 and '66 one of hard work, not so much as soldiers, as mechanics and laborers, for at several of their new stations it was necessary to construct huts to protect themselves from the severity of the winter. This work was continued into the following summer, except when interrupted by scouting between the Smoky Hill and Arkansas rivers. Having succeeded in making themselves fairly comfortable, the regiment was ordered in September to march across the country, and report to its old colonel, then General, Philip St. George Cooke, commanding the Department of the Platte.

The several troops were scattered about at Forts Laramie, McPherson, Phil. Kearny, Casper, Sanders and Sedgwick, and from these stations maintained an almost constant warfare with the Indians.

On December 9, 1866, Lieutenant Bingham, commanding Troop C, met his death in a skirmish near Phil. Kearny, and twelve days later 27 men of the same troop, with 3 officers and 49 men of the 18th Infantry, were killed in what is known as the "Phil. Kearny Massacre." Had the Indians received the chastisement they deserved for this bloody deed, it would have been in the end a kindness. Going unavenged, it only created in the minds of the Sioux a false idea of their power which ultimately cost them dearly.

Gordon, with Troop D, did some very hard scouting and escort duty around Kearny, for the Indians may be said to have held that post and C. F. Smith in a state of siege.

During the summer of 1867 Lieutenant Kidder, a gallant young officer, and ten men of Troop M, were killed while bearing dispatches to General Custer. A brief extract from a report by Captain John Mix of a scout made by his troop,—M,—in March, 1867, will depict the almost insurmountable difficulties under which this struggle with the savages was carried on. He says :

"We left the Republican March 1, in a cold wind and made thirty miles. The next morning a fearful storm of wind and snow was raging. It was only by the most violent exercise the men could keep from freezing. To add to our difficulties we struck a snow-drift which lasted all day, with snow from two to five feet deep. The crust cut the horses cruelly, and left a trail of blood behind us. We could not see twenty feet in front of us. At 3 o'clock P. M., the men and animals were unable to move another mile, and selecting the best shelter that the wind-swept plain afforded, we camped without forage for our horses, and with one wagon tongue, which I had on my company wagon, for fuel."

No one who has not marched in one of those terrible storms common to the northern plains can appreciate the suffering endured by Captain Mix and his men. The Second did its share of such work, and Captains Green, Gordon, Noyes, Mix, Dewees, Thompson, Wells, Spaulding, Egan, and Bates, and their lieutenants, deserve credit for their constant display of those qualities so characteristic of the true soldier.

In the spring of 1869 one battalion (F, G, H and L) under Lieutenant-Colonel Brackett, was transferred to Montana, where it remained for fifteen years and came to be known as the "Montana Battalion." During the following January this battalion, commanded by Major E. M. Baker, by the severe chastisement it gave the Piegan, rendered a service to the people of the territory which they have never forgotten. How well this blow was delivered, let the following extract of an order published by General Sheridan tell :

"The Lieutenant-General commanding this military district takes pleasure in announcing to his command the complete success of a detachment of the 2d Cavalry and 13th Infantry, under command of Brevet Colonel E. M. Baker of the 2d Cavalry, against a band of Piegan Indians in Montana. These Indians, whose proximity to the British line has furnished them an easy and safe protection against attack, have hitherto murdered and stolen with comparative impunity, in defiance and contempt of the authority of the Government. After having been repeatedly warned, they have at last received a carefully prepared and well-merited blow in the middle of winter, with the thermometer below zero, and when experience had led them to believe they could not be reached the blow fell. 174 Indians were killed, 300 horses were captured, and the village and property of the band totally destroyed. The Lieutenant-General cannot commend too highly the spirit and conduct of the troops and their commander; the difficulties and hardships they experienced in the inclemency of the weather; and as one of the results of this severe but necessary and well-merited punishment of these Indians, he congratulates the citizens of Montana upon the prospect of future security."

The officers who accompanied Baker on his memorable march were Captains Ball, Thompson and Norton, and Lieutenants MacAdams, Hamilton, Swigert, Batchelder and Doane. Colonel Baker was severely criticised by part of the eastern press, but was rewarded by the love of the families

immediately concerned, whose knowledge of the situation constituted them the better judges.

The following extracts from G. O. 21, series of 1870, Department of the Platte, show what the troops of the regiment in that Department were doing :

"The Commanding General announces the following creditable encounters of troops in this Department with hostile Indians, as having taken place during the last month. To the officers and soldiers mentioned he extends his acknowledgments for personal gallantry and valuable services.

"At 5 o'clock, A. M., on the fourth day of May, 1870, Brevet Major D. S. Gordon with his company,* D, 2d Cavalry, near Atlantic City, discovered and charged a body of Indians in possession of stolen stock, recovering all the animals, killing two Indians, wounding one, and dispersing the balance. Later in the day, with 1st Lieutenant C. B. Stambaugh, 2d Cavalry, and ten men, he encountered and fought for an hour and a half a party of from sixty to seventy Indians, killing five and wounding several. His loss was Lieutenant Stambaugh killed, and Sergeant Brown seriously wounded."

The same order speaks of a gallant action on the part of Sergeant Patrick Leonard and four men of Troop C, who, while marching along the Little Blue, Neb., were suddenly surrounded and fired upon by a party of fifty Indians. Private Hubbard and two horses were wounded at the first volley, whereupon the sergeant killed these animals and formed a breast-work of them. After a desperate struggle, in which the horses were all killed, the red devils were driven off and Sergeant Leonard, taking a settler's family of two women and a child under his charge, returned to the settlements. It is such conduct as this, often repeated, that has shown many a hero among our enlisted men.

The survey for the Northern Pacific Railroad was commenced along the Yellowstone in the summer of 1871, and Ball and Tyler, with their troops,—H and L,—were sent from Fort Ellis as an escort to the surveyors. In the latter part of November the party started to return, hoping to reach Ellis before winter set in, but in this they failed. A brief description of a storm that overtook these troops will serve to show what the "Montana Battalion" had to undergo in winter campaigns.

One day in the last part of the month the relief party met the returning escort a few miles west of the great bend of the Yellowstone. It was about 2 o'clock in the afternoon, and both commands started for Ellis, intending to camp in a cottonwood grove in plain sight about five miles ahead. After marching about half-way a blizzard struck the command, driving the coarse snow, as hard and cutting as grains of sand, into the faces of the men. Each officer was called upon to take his turn in leading the column, as the drifting snow quickly closed the eyes of any one peering into the storm. The weather grew suddenly colder, and after two hours of this struggle it was learned that the command had been travelling in a circle. The sensation produced by such a discovery can only be appreciated by one who has been lost on the boundless prairie in the midst of one of these terrible storms. Many men became numb from fatigue and cold, and a few threw themselves from their saddles and had to be lifted back and forced to fol-

*At this period it was customary to speak of a troop as a company.

low. It was impossible to care for the pack mules, and all efforts to drive these animals along were abandoned. Some men cried and begged to be allowed to lie down and die, while others wandered from the column and were brought back by those who kept their heads. Cries that feet, hands, and parts of the face were freezing, were heard on all sides. The weary horses seemed unable to continue the unequal struggle, and were unmercifully spurred to keep them to their work. The confusion was naturally great, and for a time it looked as if all discipline would be lost and the command scattered in every direction over the vast prairie. There was no hope save in continuing the march, and those who retained their senses fairly drove the others before them. After five hours of this terrible battle with the elements, the column accidentally stumbled on the very grove it had been seeking. Only those in front could see the trees, but Trumpeter Page of Troop G, (afterward killed under General Gibbon at the Big Hole) brave fellow that he was, seized his trumpet and sounded the "rally." Never did a call sound sweeter; it meant life. The thermometer marked 40° below zero, and 53 men had their extremities frozen, many of them seriously.

In the following summer the same battalion, with four companies of the 7th Infantry, all under Major Baker, escorted the surveyors of the Northern Pacific down the Yellowstone. On August 13 camp was pitched on the left bank of the river, and within a slough fringed with trees and brush. Pickets had been posted along the slough, and the wagons, perhaps a hundred in number, were parked in the form of an ellipse into which the mules, left out to graze, might be driven in case of attack. The night was intensely dark, but about three in the morning the pickets discovered several Indians inside the lines trying to turn the mules in a convenient direction to start them into a run for the hills. At first, due to the darkness, the Indians did not distinguish the herders as white men, and the latter quietly guided the head of the herd into the corral, so that when the rush came the animals ran in among the wagons and were secured. At this time a few shots were exchanged between the guards and the enemy, and cries of "Indians, here they come!" were heard as the officers and men were awakened and sprang to arms. At first the confusion was very great as it was almost impossible to distinguish friend from foe, and many, even Thompson, who was officer of the day, thought the pickets were firing at an imaginary enemy. This belief was quickly dissipated by a volley from the Indians, and by their devilish yells and war-whoops. The darkness, however, prevented them from taking full advantage of the surprise given the troops, and their main body was sent flying from the willows at the lower end of camp by a well-directed volley fired by the infantry. The savages, now dashing about on their ponies immediately in front of the line formed by the troops, kept up a most unearthly and diabolical screaming. As it grew lighter they were driven to the surrounding bluffs, and soon after withdrew. Ball was ordered out to observe them, but only learned that their retreat was down the valley. Baker's loss was two killed and five wounded, while the Indians afterward admitted the loss of eleven killed and wounded, and stated they had 1100 warriors present, composed of Sioux, Cheyennes, and Arapahoes. Baker's

number was about 400, and while the small loss on either side was undoubtedly due to darkness, yet the result obtained and the relative numbers engaged are significant in showing that a comparatively small body of troops did defend themselves against a greatly superior force of Indians. As the same Indians had previously shown themselves to be formidable warriors, and repeated this evidence some four years later, we may justly infer that on the occasion just described, the battalions of the 7th Infantry and 2d Cavalry proved themselves to be well versed in the tactics of this peculiar warfare. The survey was renewed at 10 o'clock the same morning, and continued about 40 miles down the valley. Game, in those days, was very plentiful along the Yellowstone and Musselshell rivers, and a great many buffalo, elk and deer, were seen and killed.

In March, 1874, Colonel Smith, 14th Infantry, with six troops of the 2d and two of the 3d Cavalry, and eight companies of infantry under Captain Lazelle, left Laramie and pushed rapidly on to the Red Cloud Agency, intending to punish the Sioux there for their many crimes, and notably for their recent murder of Lieutenant Robinson. Much was expected of this expedition, and had not the "peace policy" been permitted to interfere just when the blow was ready to fall, these Indians would have received a sound thrashing, and much, if not all, of the trouble that afterward occurred, might, and probably would, have been avoided. As it was, they were cowed into a sullen submission. However, the Indians in the Department of the Platte did not entirely escape punishment during 1874, for Captain A. E. Bates, with Troop B, 2d Cavalry, and about 200 Shoshones under Lieutenant Young, 4th Infantry, surprised a band of Arapahoes near Snake Mountain early on the morning of July 4, and won a decided victory. Twenty-five Arapahoes are known to have been killed, and it is believed one hundred were wounded; 200 ponies also fell into the hands of the victors. The Indian allies behaved very badly, and rendered little, if any, assistance. This was probably as complete a victory as was ever gained by a single troop in the whole course of our Indian wars. Lieutenant Young, one of the wounded, and Lieutenant F. U. Robinson, of Bates' Troop, were especially commended for gallantry.

The haughty spirit of the Sioux, Cheyennes and Arapahoes, was destined to be shattered in the years from 1876 to 1879. Many regiments assisted in this work, performed deeds of valor and suffered hardships, but it stands to the credit of the 2d Cavalry that while it was first to take the field in 1876, it was also in at the death in 1879.

In February, 1876, a number of adventurous spirits, who had entered the Yellowstone valley in search of wealth without any definite idea of how it was to be obtained, found themselves besieged in a hastily built stockade near the mouth of the Big Horn. The battalion at Ellis went promptly to their assistance and by a month's hard marching, in the midst of snow and cold, succeeded in saving the lives of these men. It is believed this was the first movement made against the Sioux in 1876, antedating as it did by several weeks Colonel Reynolds' campaign on Powder River, in which Troops A, B, E, I and K participated. Reynolds struck the Indians under Chief Crazy Horse March 17, and Egan, with Troop K, made a successful charge

through the village, which was temporarily held. Noyes succeeded in capturing a large number of ponies, but on the return march of the main command these were retaken by the enemy.

Scarcely had the Ellis battalion returned to its station when it was called upon to join in that memorable campaign in which, without winning a single engagement, if we except the rather indecisive affair at Slim Buttes, our forces broke the backbone of the Indian resistance in the north. In this determined effort to subdue the hostiles, who were known to camp along the lower Yellowstone and its tributaries, the Government sent troops from the Platte under General Crook, and from Dakota under General Terry, in whose column was General Custer with the 7th Cavalry. With General Crook were Troops A, B, D, E and I, 2d Cavalry, and the officers of the regiment who accompanied him on his long and persistent pursuit were Captains Noyes, Dewees and Wells, and Lieutenants Rawolle, Swigert, Pearson, Kingsbury, Sibley and Huntington. The "Montana Battalion" served under General Gibbon, who commanded such of General Terry's troops as came from the west. This column, which also included six companies of the 7th Infantry, left Ellis about the 1st of April and moved down the Yellowstone valley. It was necessary to cross and recross the river several times, and probably no one ever forded this stream without hoping he would never be called upon to repeat the task. On one of these occasions Lieutenant Schofield's horse lost his footing, and both man and horse disappeared beneath the rapidly moving waters. It seemed that both must be lost, but finally the horse regained his footing and men rushed in to the rider's rescue. Schofield, who served against the Sioux for years, was never nearer death than on that occasion.

A courier overtook the command near the Big Horn River with orders to halt, as Crook and Custer would not be able to take the field for several weeks; whereupon General Gibbon established a camp near the mouth of the river just named. While lying here, Troops H and F, Ball and Roe commanding, were ordered on a reconnoissance through the valleys of the Big Horn and Little Big Horn, with a view to discovering, if possible, the whereabouts of the hostiles. This reconnoissance lasted a week, and while the Indian village was not found, it proved to be a very trying march. As a precaution against surprise, two of the four officers and one troop stood guard day and night. It so happened that one of Ball's camps was made on the identical spot where, a few weeks later, Custer fought his last fight.

On June 21, while the battalion was lying in the camp just mentioned, Custer's long line of cavalry was descried winding across the hills on the opposite bank, and the same day the steamboat *Far West* arrived with General Terry and staff on board. There were now in the field three columns,—Crook's, Custer's and Gibbon's. The former had fought a drawn battle with the Sioux a few days before, a fact wholly unknown to General Terry's command, and had fallen back to his wagons to await reinforcements. It had been learned that the Indian trail led from the Rosebud toward the Little Big Horn River, and General Custer was ordered to follow it, while General Gibbon was to return up the valley of the Yellowstone and cross the river a few miles below the mouth of the Big Horn, and then push

for the Little Big Horn to get below the Indians on that stream, while Custer struck them from above. Gibbon had the longest and roughest route. Custer sent a battery of Gatling guns across to him for fear they would delay his march. The Department Commander—General Terry,—accompanied the Montana Column. These troops crossed the Yellowstone on the 24th, by means of the *Far West*, and the next day moved a few miles up Tullock's Fork, then turned to the right and ascended the ridge between that stream and the Big Horn. After a tiresome march the Big Horn was reached. General Terry gave the cavalry a short rest, and then pushed on with it, leaving the infantry to follow. The next morning, after a short march, Lieutenant Bradley, 7th Infantry, chief of scouts, discovered on the opposite bank of the Big Horn two Crow Indians, who, with others, had been detached from Gibbon's command as guides for Custer. These scouts reported that Custer had been badly beaten the day before. While halting here the infantry came up, and the united command moved on and soon reached the Little Big Horn, at which General Terry seemed much relieved, saying,—“Well, I have kept my word with Custer. I promised him to be here to-day.” The command halted for a little time on reaching the river. While here a courier was dispatched to Custer's supposed position, but was driven back by the Indians. The march was resumed and continued twelve or thirteen miles up the valley, when, about 6 o'clock in the evening, a few Indians were seen hovering around the head of the column and several shots were fired at Troop F, under Roe, which had been thrown out to cover the right flank. To the left and front, on the hills across the river, were seen objects supposed to be buffalo lying down. As twilight advanced there appeared on the right and front what seemed to be a long line of cavalry, but night came on before anything definite could be learned of the objects seen, or of Custer's fate. It was evident, however, he had not won a victory. About half past eight, the infantry having marched between 29 and 30 miles, both battalions were ordered into camp. Gibbon's command, including the artillery, numbered a little over 400 men, but it was kept well in hand, and was capable of making an excellent fight.

Making an early start the next morning, June 27, the command had proceeded but a mile or two, when it reached a large bottom containing signs of having been occupied by an extensive Indian camp a few hours previously. The fate of Custer was now more puzzling than ever, but soon a message was received from the chief of scouts saying he had counted 196 dead cavalymen. The objects seen the day before looking like buffalo lying down, were really dead comrades and their horses.

Soon two horsemen were seen dashing down the valley. They were officers,—Wallace and Hare, if the writer's memory is not at fault,—sent by Reno to tell of their desperate fight, and how the Indians seemed determined upon their extermination, until Gibbon's column appeared on the bluffs the day before. “Where is Custer?” was then asked. They replied: “The last we saw of him he was going down that high bluff towards the lower end of the village. We do not know where he is now.” They were told, “We have found him.”

The line of Reno's retreat to the hills, from his first position in the val-

ley, presented a sickening sight, the dead being horribly mutilated, while on the part of the field where Custer fell the mutilation was comparatively slight.

The burial of the dead, which was of necessity in many instances more of a pretense than reality, having been accomplished, the care and transportation of the wounded demanded attention. Hand litters were first made and their inefficiency demonstrated, when the fertile genius of Lieut. G. C. Doane, 2d Cavalry, evolved a mule litter, and upon these the wounded were carried very comfortably. These unfortunates having been finally placed on a boat in the Big Horn, Gibbon's command, increased by what was left of the 7th Cavalry, returned to the north side of the Yellowstone to await reinforcements.

Let us now turn to the troops under Gen. Crook, and see how they, particularly those of the 2d Cavalry, fared in this savage contest with the Sioux. On June 17, Crook found himself on the Rosebud, searching for the village which he felt confident was not far off. About half past eight in the morning, while the Indian allies were out scouting and the remainder of the command lying in the valley with horses unsaddled, the wily Sioux suddenly appeared, and about the first intimation the troops had of their presence was the panic-stricken return of the scouts, immediately followed by the enemy's fire. The attack was probably a surprise, pure and simple, but both commander and men were too experienced in Indian warfare to be thrown into confusion, and soon presented a bold front to the enemy. The Sioux came on with a rush, numbering perhaps not less than 2500 warriors.* After the first attack was repulsed the enemy rallied, and skirmishing continued for some time, during which the heaviest loss fell on the 3d Cavalry, of which ten troops were present, and Captain Guy V. Henry of that regiment was wounded. As the day wore on Gen. Crook became restive because of the indecisive nature of the action, and ordered Mill's battalion of the Third, supported by Noyes' battalion of five troops of the Second, to move down the creek, through a cañon, to attack the village supposed to be about ten miles distant. The movement was being executed when it became necessary to recall these battalions to the assistance of the troops under Colonel Royall, who was hard pressed. As the command became once more united, the Sioux drew off in the direction of their village, and the combat ended. Gen. Crook's loss, including that of his allies, was 10 killed and 35 wounded. The Sioux left 13 dead on the field, and, it is believed, carried some off.

While lying in camp on Goose Creek, Gen. Crook decided to send out a scouting party to locate, if possible, the Indian village. Lieutenant Sibley of the 2d Cavalry was selected to command, and given 25 men picked from the five troops of the regiment. In his party were also two scouts,—Guard and Pourier,—in whom the general had much confidence, and Mr. Finerty, a correspondent of the *Chicago Times*. This little detachment, well supplied with ammunition, left camp on the afternoon of July 6, and by 2 o'clock the next morning, after having marched forty miles, halted a short distance from the Little Big Horn. After a brief rest Sibley was again in

* "War-Path and Bivouac." Finerty.

his saddle, advancing cautiously, as the scouts, who were familiar with the life and camping grounds of the Sioux, believed the village was near by. These keen-eyed men of the plains soon discovered a formidable war party, whereupon Sibley moved his little band toward the mountains, intending to cross them if possible, and hoping that the Sioux, who seldom took to the rough mountain trails, would not follow. The savages, however, found his trail and pursued like bloodhounds. "Men," said Sibley, "the Indians have discovered us, and we will have to do some fighting. If we can make an honorable escape, all together, we will do it. If retreat should prove impossible, let no man surrender. Die in your tracks." "All right, sir," was the soldierly reply. The retreat was continued until some time in the afternoon, and as they had not been overtaken the little band of heroes began to think they had escaped the threatened danger, but it was just at such moments the wily Sioux was wont to pounce upon his prey, and suddenly, as if coming out of the ground, the enemy appeared and poured in a ringing volley. Hastily taking shelter in the edge of some adjacent woods, Sibley dismounted his men, and ordering some of them to fire on the Indians to check their advance, secured his horses after several of them had been wounded. The trees and fallen timber made admirable breast-works, and behind these our heroes fought, and held at bay many times their numbers. The struggle seemed hopeless, and but for the strategy employed would have proved so. As the numbers of the enemy were constantly swelled by reinforcements, Sibley despaired of saving his horses, and leaving them tied to trees where they could be seen indistinctly by the savages, he cautioned his men to go to their saddle-bags for all their ammunition, and, after firing a couple of scattering volleys, to follow him on foot into the thick woods and among the rocks, where a horseman could not pursue. How this little band pressed on for two days through fallen timber, over rocks and across mountains, without food or sufficient clothing to protect them from the cold at night, would make a thrilling story if space permitted the recital. Suffice it to say that a short time after leaving their horses they heard a heavy volley, followed by war-whoops, and they knew the Indians had made their final rush on the abandoned position. After almost incredible vigilance and marching, they reached Crook's camp on the morning of July 9, and the oldest and most experienced officers in the command concurred in saying their escape from such a perilous situation was without parallel in the annals of Indian warfare.

The death of Capt. Lewis Thompson, who had been an officer of the regiment since February, 1862, occurred in one of General Gibbon's camps on the Yellowstone during July. Thompson was a most agreeable companion; bright, witty, well read, and as a soldier brave to the verge of rashness. He was taken prisoner at the battle of Gettysburg, and the hardships and privations accompanying his confinement of fifteen months in Southern prisons, so shattered his health that he never fully recovered it. Upon his death, which was greatly regretted throughout the regiment, the command of his Troop,—L,—devolved upon Lieut. S. T. Hamilton, who had been a member of the expedition from the start.

In the latter part of July Terry sent three scouts to find Crook. They

returned in a few days and reported his location on Goose Creek. On August 8, Terry's command, 1700 strong, started up the valley of the Rosebud, and two days later met Crook's forces marching down. The latter officer had 25 troops of cavalry and ten companies of infantry. Thus in the two commands there were 36 troops of cavalry. However, rapid movements were not the order of the day, and the united commands moved slowly over to Tongue River and thence down the Powder to its mouth. The distance marched was 120 miles, and seven days were consumed in making it. When finished no one knew where the Indians were. The horses were under saddle the greater part of the daylight of each day, to average 17 miles in 24 hours. Such marching is most trying on cavalry, as it breaks the animals down to no purpose. Much of Crook's cavalry was in bad condition when he met Terry, although he had been encamped for weeks in a fine grazing country, but by the time the mouth of the Powder was reached many horses in each column were *hors de combat*.

When the two commands united on the Rosebud, the "Montana Battalion" met the five troops of the regiment under Noyes, after a separation of seven years. How they mingled and gossiped can only be appreciated by brother soldiers who have been long separated. The writer recalls how Rawolle, in particular, in the quiet but decided manner peculiar to him, told of their marches and contests.

At the mouth of the Powder the commands separated; Gen. Crook going in the direction of the Little Missouri, while Gen. Terry crossed the Yellowstone and moved over toward the Big Dry, at the Dry Forks of the Missouri. These movements again divided the battalions of the Second; the one under Crook entering on that long and wearisome march, during which such battle was to be had with hunger.

Besides the officers of the regiment previously mentioned as serving under Crook, Lieut. W. P. Clark joined that general at Powder River, and in the skirmish which subsequently took place at Slim Buttes, distinguished himself, as he always did when opportunity offered.

In the early spring of 1877 the "Montana Battalion" again took the field, and reported to Gen. Miles at Tongue River. This officer attacked Lame Deer's camp of the Minneconjou Sioux, May 7, on Little Muddy Creek, a tributary of the Rosebud. He had with him the battalion of the Second under Ball, two companies of the Fifth, and five of the 22d Infantry. A part of the infantry rode captured ponies. The village was taken with a rush, Lieut. E. W. Casey, 22d Infantry, and Lieut. L. H. Jerome, 2d Cavalry, charging directly upon and through it. Both of these officers were mentioned for gallantry. The Indians retired to the surrounding bluffs and made an obstinate resistance, and during this part of the engagement Lieut. A. H. Fuller of Tyler's Troop (F) was wounded. Among the wounded was also Private D. L. Brainard, Troop L, who afterward won such distinction under Greely in the north, and who is now a lieutenant in the regiment. The Indians left 14 dead on the field, and 500 ponies, together with 51 lodges, and their contents fell into the hands of the victors. Lame Deer is believed to have fallen by the hand of Captain Wheelan. After this engagement the battalion of the Second, excepting Troop L, was kept busy during

the summer and early fall scouting along the Yellowstone, Tongue, Powder and Little Missouri rivers, and that the manner in which the duty was performed was satisfactory, the following letter, addressed to Captain Tyler by General Miles' adjutant, will show :

"In relieving the Battalion 2d Cavalry, the commanding officer is pleased to acknowledge its valuable service during the spring and summer operations against hostile Indians. Equally on the most fatiguing and laborious march in pursuit of fleeing Indians, as in action, you have displayed those qualities most commendable to the American soldier, and you will please convey to the officers and men of the battalion his sincere appreciation of the same, and express to them his regrets at being obliged to part with a command whose faithful performance of all duties he could so truly rely upon."

Chief Joseph, of the Nez Perces, may properly be termed the Indian Xenophon. His long retreat in 1877 through Idaho and Montana, pursued as he was by various columns of troops, is worthy of record in the annals of war. General Howard followed him with great persistence, but in vain. Norwood with his troop (L), brought him to stand at Camas Prairie, but being greatly overmatched in numbers, and not receiving the support he expected, was unable to detain the Indian chief long enough for General Howard to come up. The Troop made a gallant fight and reflected much credit upon the regiment. Gen. Gibbon, with part of the 7th Infantry, dealt Joseph a staggering blow on the bloody field of the Big Hole, and General Sturgis, with some of the 7th Cavalry, fought him on the Yellowstone, but all in vain, for the Indian general continued his headlong flight, and had he not stopped to procure buffalo meat when the close proximity of the British line gave him a feeling of security, his retreat would have been crowned with success. This halt enabled Miles with three troops of the 7th Cavalry, several companies of his own regiment, and Troops F, G and H of the Second, to strike the Nez Perces on Sept. 30 near the Bear Paw Mountains, and, after a desperate fight followed by a siege lasting until Oct. 6, to capture the greater part of the tribe. Thus it was that twice in this memorable campaign the Second Cavalry was represented, and upon two far distant fields. In the latter engagement Lieut. Jerome, Troop H, was made a prisoner and held for 24 hours, at the end of which time he was exchanged for Chief Joseph.

After the engagement at the Bear Paw, Tyler's battalion was ordered as an escort to the American members of the "Sitting Bull Commission," and escorted them to the British line. With this duty completed the battalion returned to Fort Ellis, having been in the field continuously for eight months, and having marched about 2500 miles. In the fall of this year the headquarters of the regiment, and the eight troops stationed in the Platte, were transferred to the Department of Dakota, and stationed at Custer and Keogh, with headquarters at the former post.

In March, 1879, Innis N. Palmer, who had succeeded T. J. Wood as colonel of the regiment in June, 1878, retired, and was followed by Colonel J. W. Davidson. In the summer of 1879 Gen. Miles made an expedition against the northern Sioux along Milk River. On July 17, Lieut. W. P. Clark, with Troop C, under Hoppin; a company of the 5th Infantry

(mounted) under Borden; and a number of Indian scouts, was ordered forward as an advance guard. He came unexpectedly upon the hostiles, and, with his usual dash, rushed boldly at them, at the same time sending a courier back to notify the main column. At first the enemy gave way, but soon rallied and surrounded Clark. Miles pushed rapidly forward with reinforcements, consisting of six troops of the Second, commanded by Majors Baker and Gordon, and several companies of the 5th Infantry mounted on ponies. Rice, of the latter regiment, was present with two pieces of artillery, and these, with the broken hills which the column had to cross, somewhat delayed the progress of the main body for a time, but the soldiers, realizing the importance of the guns, would quickly pull them out of a ravine, no matter how deep. A second courier arrived, his pony panting and covered with foam, bearing a message from Clark saying he was nearly surrounded and asking for speedy help. The main body had now fortunately reached smooth ground, and it went forward at a gallop, with Gordon's battalion deployed as skirmishers, and Baker's and the mounted infantry in column some two hundred yards in rear. Seeing Miles advance the Sioux gave way, but kept up a running fight with Clark, who followed close upon their heels. The command presented a beautiful sight as it galloped forward over the green and gently rolling hills, pursuing a swarm of gayly blanketed Indians. This pursuit was kept up for about fifteen miles, and no one who witnessed that day's work will ever forget the excitement of the chase. The artillery moved with the skirmish line, and in the latter part of the race fired several shots. The enemy succeeded in reaching and crossing Milk River, and escaped under cover of the night.

In March, 1880, the restive spirit of the Sioux induced some of the more venturesome to hover around Forts Keogh and Custer, and gave Huggins, Cook and Brett, with Troops C and E, and a number of Cheyenne scouts under the last named officer, an opportunity to distinguish themselves by making a very rapid pursuit from Tullock's Fork to O'Fallon's Creek, where they overtook the Indians, and, after a sharp fight, captured the camp, several prisoners and over 100 ponies, with a loss to the troops of only one killed. Lieut. Kislingbury, 11th Infantry, who lost his life on the Greely expedition, also accompanied this command. Gen. Miles was so favorably impressed with the energy and good judgment shown in this affair, that more than ten years later he invited attention to it a second time, and recommended that Huggins and Brett, the only surviving officers, be breveted therefor.

During the next four years the regiment was kept busy marching back and forth to overawe the Indians, but their haughty spirit had been humbled and they were easily held in subjection. The last action in Montana in which any part of the regiment participated was between Troop L, under Norwood, and a band of Cree Indians, near Wild Horse Lake, in which the Indians were defeated with the loss of several warriors. This was in the spring of 1883.

Thus we see that in Montana the battles of the Second commenced with the terrible thrashing given the Piegans in January, 1870, and ended in April, 1883, near Wild Horse Lake. In these thirteen years of toil and

strife, in the very heart of the most hostile Indian country on this continent, the Second alone saw the beginning and end of the conflict. It was seldom its engagements were indecisive; victory generally alighted on its guidons, defeat never. Surely this was not all luck. The lessons gathered in the everglades of Florida and on the plains before the Civil War, and transmitted from one generation of officers to another, bore their legitimate fruit and it was good.

In the early summer of 1884 the regiment was transferred to the Division of the Pacific, with headquarters at Walla Walla. Nine troops went to the Department of the Columbia and three into California. Before leaving Montana the following letter was addressed to the regimental commander, General John P. Hatch, who became colonel in 1881:

HEADQUARTERS DEPARTMENT OF DAKOTA,

FORT SNELLING, MINN., June 16, 1884.

General:—I cannot suffer the 2d Cavalry to leave this Department, for another sphere of duty, without expressing to you and to your officers and men my sense of the value of the services which it has rendered while it has been under my command, and my respect and admiration for its character. It is now fifteen years since a portion of the regiment came into this Department; it is seven years since the whole of it reported to me. During all these years it has been constantly called upon for duty in the field, often for service in active campaigns against hostile Indians; and in all this service, whether in field or garrison, it has displayed soldierly qualities of the highest order, gallantry in action, patience under hardship, subordination to authority, and a quiet, unassuming devotion to duty worthy of the highest praise, and worthy also of the splendid history which it had made for itself in the past.

I beg you to accept for yourself, and for your officers and men, my most hearty good wishes for your and their prosperity and happiness, and also the expression of my belief that no regiment in the service has ever won a more honorable reputation than that which is deservedly borne by the Second Cavalry.

Sincerely yours,

(Signed) ALFRED H. TERRY,
Brigadier-General, Commanding.

The service required of the regiment in the Department of California and Columbia was simple. Several long marches were made, but no serious difficulties arose with the Indians. During the year 1885, Lieut. H. T. Allen, 2d Cavalry, made an extensive and important exploration in Alaska. His report added very materially to our previous knowledge of that distant territory.

In May, 1885, Chief Joseph and his followers, who were sent to the Indian Territory after their capture, were permitted to return to Washington Territory not far from their former home. It fell to the lot of Lieut. Carleton, with Troop L, to escort these people to the district assigned them. It was this troop that fought these Indians so valiantly at Camas Prairie in the summer of 1877, and now, eight years later, we find it escorting them as a guard against their white neighbors who threatened them.

While enjoying the comforts of that charming station, the Presidio of San Francisco, Troops A and K were, in December, 1885, suddenly called upon to depart for Arizona to assist in the pursuit of Geronimo and his

band. The sands and cacti of that territory were indeed a change from the handsome roads and well kept lawns of the Presidio, but the troopers and their officers,—MacAdams, Doane, Robinson and Brett,—took kindly to their old life in bivouac, and rendered valuable services in the campaign against the Apache, in whose country they remained about nine months. In his annual report the department commander, Gen. Miles, in speaking of a pursuit made by Lieut. Brett, says that officer displayed great energy and determination.

While in the Department of the Columbia General N. B. Sweitzer, who had been a major in the regiment, succeeded General Hatch as colonel, and was in turn followed by Colonel D. B. Clendenin.

In June, 1890, the regiment exchanged with the 4th Cavalry, and took station in Arizona, with the headquarters and two troops at Lowell, and the other troops at Huachuca, Bowie, San Carlos and Whipple Barracks. That summer the order was issued from the War Department discontinuing two troops and two companies in each regiment of cavalry and infantry. In this way Troops L and M ceased to exist, except "on paper." L has since been reorganized as an Indian Troop, and let us hope the day is not far distant when the guidon of Troop M will again take its place in the column. Soon after reaching Arizona we find Fowler, Winn, Brainard, Sargent, Nance, Lewis, Michie, and others, in the field in pursuit of the ubiquitous Kid and his followers. Lieut. Michie, especially, performed most arduous service, and was complimented therefor by the division commander.

In January, 1891, the headquarters and three troops were ordered to Fort Wingate, N. M., where they now (February, 1892,) are, and Troop G,—Wheelan's—took station at Fort Stanton at the same time. The Moqui Indians, who have lived quietly in their pueblos for centuries, were finally so exasperated by having their children taken away to be sent to school, that they were on the verge of open rebellion in June, 1891, and threatened to kill Brett, who, with a small detachment, had occasion to visit one of their villages,—Orabi. This officer with great good judgment managed to extricate himself and men, and then asked for reinforcements. Major Jackson, commanding the battalion at Wingate, promptly sent two troops to the rescue, accompanied by Lieut. Wallace with two Hotchkiss guns, Major McLellan, with two troops of the 10th Cavalry, was also ordered out. When this force arrived before the village, the Moquis quietly surrendered. With this little affair the campaigns of the Second have, for the present, come to an end. How long this peace will last none can say, but in the future, as it has been in the past, it is confidently believed the Second Cavalry,—old Second Dragoons,—will be true to its motto, "*Toujours prêt.*"

Since the Civil War the regiment has lost three officers and sixty enlisted men killed in action, with one officer and thirty-eight men wounded.

Shining through the storms of fifty-six winters, the smoke of one hundred and seventeen combats and the dust of countless weary marches, appears the glorious roster of those men of the Second Cavalry who have shed their blood or lost their lives in service; a grand aggregate of forty-eight commissioned officers, and seven hundred and eight enlisted men.

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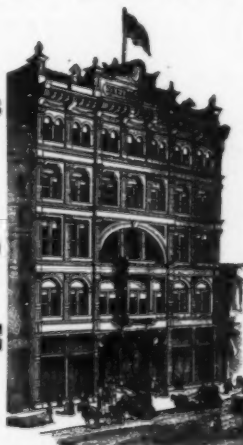
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Silver Medal, Austria, 1879.

Gold Medal, Royal Agricultural Society, London, Eng., 1879.

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Both Gold and Silver Medals, The International Health Exhibition, London,
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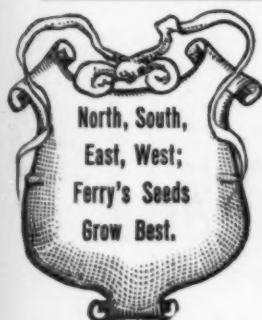
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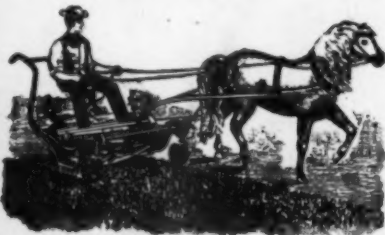


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So Pears' Soap—because it is nothing but soap, no free fat or alkali in it—nothing but soap—is the means of personal civilization. Begin with the baby, if not too late; but better late than never; and never too late to mend.

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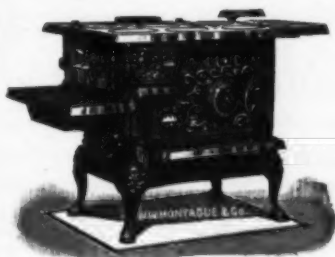
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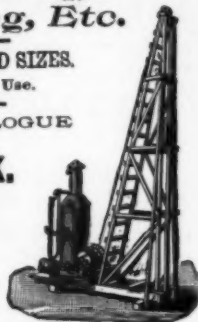
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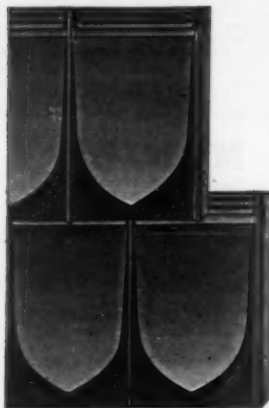
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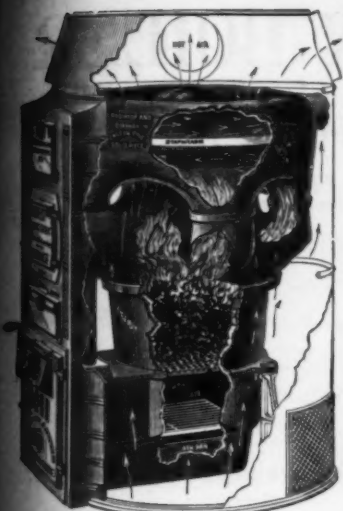
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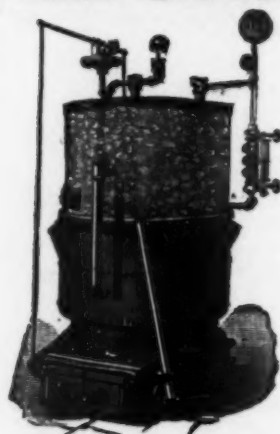
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